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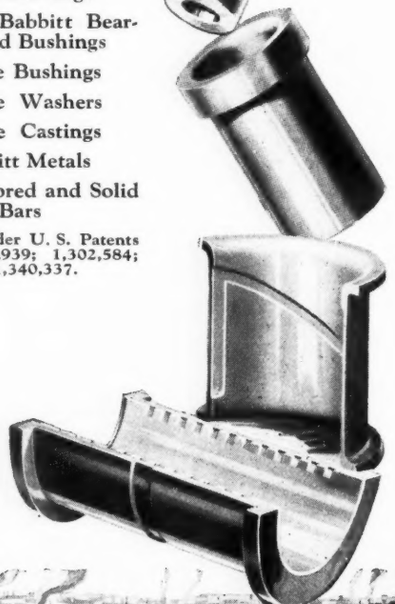

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Production during the first quarter of this year was 4,150,000 pieces, against 3,750,000 in the first quarter of 1926, and 2,500,000 in the first quarter of 1925. This compares with an automobile production of 828,874 in the first quarter of 1927, 1,018,272 for the same period in 1926, and 802,020 for the first quarter of 1925.

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AUTOMOTIVE INDUSTRIES
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Trend Toward More Car Models Helping *Parts Makers*

Tendency of automobile manufacturers to market complete lines is accompanied by policy of going outside for parts to hold down plant and tool investments.

By Norman G. Shidle

"THAT'S my story, anyhow, and I'll stick to it." Not so very many months or years ago, automobile manufacturers, by offering a single model or two as their entire line, seemed, tacitly at least, to have the foregoing sentence as the basis of their policies in regard to range of models. The possibilities of lowering production costs by concentration on a single model if possible, as demonstrated most strikingly by Henry Ford, had caught the imagination of many executives in the industry.

Every effort was made by a large majority of manufacturers to hold down the number of models to a minimum so that repetitive production processes could be employed to a maximum degree and new low prices placed on the finished product. The result was the development by American producers of the most efficient and lowest-cost individual transportation in the world and the popularization of the automobile to an extent not even conceived by the pioneers of the industry.

But that policy, useful and essential as it was for the period during which it had its greatest popularity, began to develop flaws as the industry progressed and the economic conditions surrounding it began to change.

Sales resistance to a too greatly standardized product began to mount, increasing merchandising costs to a point high enough to offset the relatively slight additional economies which still could be obtained from pushing to even further limits the single model idea.

Gradually a swing back toward more models per manufacturer began. Those makers who had gone furthest on the road toward standardization and reliance on quantity production and low price alone as a sales argument, naturally were slower to change direction than those who had embraced that philosophy with less passionate ardor.

Finally, during the last few months, the trend toward a multiplicity of models in each producer's line has become almost a rushing torrent.

Makers who previously clung fast to one or two models have expanded their line to include four, five, six or seven different chassis.

Others who already had two or three models have added two or three more.

Those who already had what once would have been considered a multiplicity of models have been busy with body and accessory changes to make two series where one grew before.

An avid seeking after more complete coverage of all possible markets undoubtedly is the outstanding sales tendency in the passenger car field as 1927 rolls on and as 1928 models continue to come through in announcements.

Almost every passenger car maker in the field will be offering in 1928 models covering a wider price range and a wider style appeal than he did in 1927 or in 1926. A new humor has seized the industry, seized it strongly enough already to make certain of swaying substantially its immediate marketing future, at least.

The trend toward a multiplicity of models has become almost a rushing torrent. Almost every passenger car maker in the field will be offering, in 1928, models covering a wider price range and a wider style appeal than he did in 1927 or in 1926

Basically, this striving for wider coverage by each manufacturer should have thoroughly good effects. It is dictated no less by the changing economics underlying the industry's progress than by more immediate sales necessities.

The public to which automobiles are being sold today is not the same pub-

lic to which they were being sold 10 years ago. The automobile, once a plaything, has become a transportation necessity for the individual American citizen. It has been an integral part of his life for a good many years. He has come to accept individual transportation as a commonplace, as a necessity of life almost.

So again the scene is changing. Instead of feeling it wonderful that he can get this sort of transportation at a price which he can afford to pay, Mr. Public now accepts that fact as a matter of course. And, inevitably, he is beginning to demand something plus in the way of comfort, appearance, ease of handling, performance and style. And in making these plus demands, the various individuals who make up the public quite logically want different things. That same difference of opinion which, it has long been noted, makes horse racing continue a popular sport, makes differing demands as regards these plus qualities in an automobile. And to meet these new demands, differing from individual to individual, the automobile manufacturer probably is moving along sound lines by creating and selling a wider variety of products than he used to offer.

IN respect to the parts industry, the current trend toward more car models can be viewed only as a distinctly advantageous one.

As far as the automobile manufacturer is concerned, he probably is moving along sound lines by creating and selling a wider variety of products than he used to offer.

The merchandising problems brought about by a multiplicity of models cannot all be written down on the credit side of the ledger, however. The relatively large number of chassis models in each of many leading lines, to say nothing of the almost infinite number of different body styles which now are being made available, means that no dealer except the largest can be expected to carry anything like a full line of models in stock.

The factory production problem inevitably is complicated very greatly.

Trends of this kind, just as was the case with the heavily developed zeal for quantity production at any cost which enveloped the industry a few years ago, set up side currents which influence things at the edge of the main stream; things which for a while must be molded by the sweep of the main stream, but which fundamentally are akin to the bed of the stream itself and in the long run may mold its course in turn.

The recent tide toward multiplicity of models in each line of cars is worth study from at least two separate viewpoints as related to the automotive industry as a whole; the effect on the independent parts makers, the effect on production methods, economies and car prices, and the effect on the various distributing phases of the trade.

The acceleration of this trend toward more models per manufacturer has been and seems certain to continue to operate very strongly to the benefit of the independent parts manufacturer and thus to strengthen an important element in the industry after several years of rather hard going.

Production Difficulties

Manufacturers who have been concentrating on standardized production of one or two models for a long while, naturally run into production difficulties and heavy tooling expense when they begin to expand their lines very materially. It is natural that, under these conditions, they would look more carefully into the possibilities of getting the various jobs done more economically and without added investment to themselves by utilizing the already existing facilities and trained personnel of competent independent parts manufacturers. That a good many car builders would do just that became apparent a good while ago. As far back as January of this year, we find J. C. Gourlie writing in *Automotive Industries*:

"There seems to be a growing realization that the one-roof idea has been turned into something of a fetish and there is undoubtedly a disposition to examine the respective merits of opposing production theories in the light of unprejudiced reason and to discover that the parts makers, on certain items, have advantages to offer that are magnified in these days of fierce competition and rapid changes to meet the public taste.

"The parts makers were never in better condition to render service," Mr. Gourlie continued. "They were put on the defensive when the car factories a few years ago began to integrate production. Wholesale eliminations had to be made and those who remained did so by expanding their knowledge and bettering their methods . . . The companies left are in the main strong financially, thus satisfying one of the outstanding needs of their customers—for stable and reliable sources of supply. Most of them now can change production schedules more quickly and at less cost than the car manufacturers, and this is helping them to win and hold business."

The events of the last six months have strengthened the trends indicated in Mr. Gourlie's statements, the increased spread in the lines of individual makers influencing very favorably those tendencies already under way.

The very definite way in which the current trend has been influencing the amount of business going to parts makers is shown clearly by analysis of the situation as regards a few major units. Naturally the larger producers are of most importance to the parts maker from a buying standpoint and it is the trend among these leaders which means the most to him. The following figures show the percentage of each of the units mentioned bought from independent parts makers by the 25 companies which had the largest output in 1926:

	January, 1926	July, 1927
Engines	21.4%	28.8%
Clutches	47.8%	70.4%
Transmissions	31 %	31.5%
Rear axles	30.2%	33.4%
Steering gears	63.5%	69.9%

In every case, it will be noted, the car manufacturers are buying a larger proportion of units from independent parts manufacturers today than they were a year and a half ago.

In respect to the parts industry then, the current trend can be viewed only as a distinctly advantageous one.

The merchandising problems brought about by a multiplicity of models cannot all be written down on the credit side of the ledger, however. The relatively large number of chassis models in each of many leading lines,

to say nothing of the almost infinite number of different body styles which now are being made available, means that no dealer except the largest can be expected to carry anything like a full line of models in stock. The factory production problem inevitably is complicated very greatly, not only from a mechanical, but from a scheduling standpoint.

A Problem in Mathematics

The attempt to correlate demand for different types and models with a production schedule must, in some factories at least, assume the proportions of a problem in higher mathematics. The allocation of the various models as they are produced, so that each territory may have its desired proportion of each; that each distributor may get enough of the models he wants and not too many of those he doesn't want—these are only a few of the operating difficulties which are tremendously increased by a multiplicity of models.

With these rather directly factory problems, comes the additional one of getting a single set of dealers capable of marketing successfully a range of cars differing widely in both price and style appeal. Ever since the beginning of the automobile business, manufacturers have found it extremely difficult, if not often practically impossible, to market through a single set of dealers what is generally known as "a complete line"; this despite the fact that the announcement of a complete line by a manufacturer usually is presented as something of distinct advantage from a dealer standpoint.

To view the past records in this regard, mention of names is scarcely necessary. Obviously the various General Motors makes never have been integrated; each company of the big organization has its own dealer organization and its own factory selling organization. One maker with a complete line has had considerable trouble in getting across his highest priced model through the dealer organization which has been highly successful in marketing the rest of his line. Another trouble is getting dealers enthusiastic about his lowest priced job. Another maker with a complete line has found that the same set of dealer salesmen doesn't seem to be able to sell successfully both the high priced and low priced models in the line. As a result the factory is trying hard to insist on two separate sales forces in all their dealer establishments, one concentrating entirely on the middle and high priced models and the others entirely on the lower priced models.

Aside from the important matters of capital, experience and knowledge, it has been rather hard in many lines of endeavor for ordinary human beings to put behind two or three things of somewhat differing sales appeals the same energy, enthusiasm and sincere conviction which they often are able to focus on one. This human element undoubtedly has to be considered when discussing the possible limitations of the multiple-model theory as it may affect future automobile selling.

Dangerous if Carried too Far

Even those executives who see the present trend toward more models as thoroughly sound recognize pretty clearly that the effectiveness of the idea depends largely on how it is handled and how far it is carried. Too many models for marketing efficiency easily could be added, just as too few were made available in some lines previously.

The standardization idea was good for a long while until carried too far. Probably the same thing will be true of the present trend. It is a highly useful means of meeting newly arisen sales considerations, but it has its limitations which the industry undoubtedly will recognize when they are reached.

Ford's New Car Won't End Model T Parts Business

SINCE the announcement by Ford that he was bringing out a new model to supplant the Model T there has been considerable speculation as to what would happen to the thousands of manufacturers, jobbers and dealers who have been making and selling parts for the present Fords, and equipment used in maintaining the large number of them in use.

Some interesting material on this subject has been issued by M. D. Graham, manager, Service Parts Division, A.E.A. Greater Market Development Plan. Says Mr. Graham: "Why anyone should think that this business is suddenly to be cut off is a mystery. There is every reason to think that manufacturers, jobbers and dealers will enjoy a most prosperous business for four or five years to come, no matter what the new Ford model happens to be.

"Press dispatches announced on May 25, last, the completion of the fifteenth million Model T Ford. In March of this year, according to the figures of one of the leading listing companies, there were 9,859,076 Ford passenger cars and 1,466,445 trucks registered, a total of 11,325,521.

"For the sake of being on the safe side, let us say that ten million are in service today, which means that five million of the fifteen million built are out of service.

"It is obvious that 1927 will be the biggest opportunity for the sale of parts and service on present models of Ford cars and trucks. This market consists of the service requirements of ten million Ford cars actually in operation.

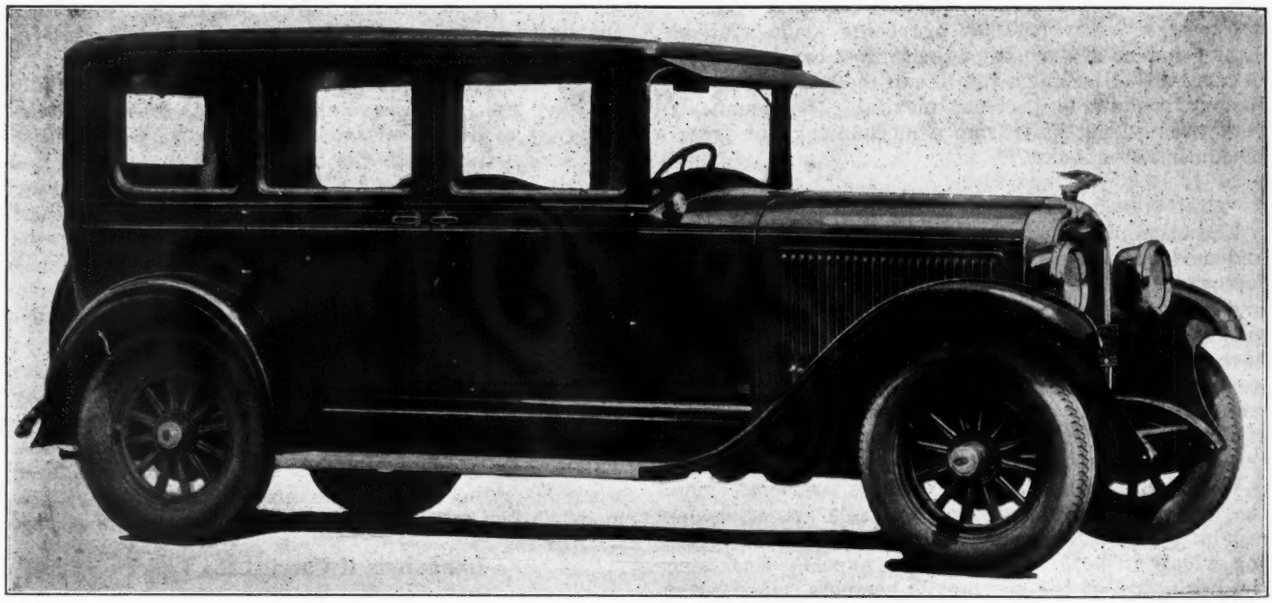
"By May of next year, 1928, figuring the past ratio of retirement of Ford cars, the market will have been reduced by about a million cars. This still leaves nine million cars requiring parts, equipment and service. This market of 1928 is equal to the market of June, 1925, the second biggest year in the Ford replacement parts business.

"At the beginning of 1929 there will still be a tremendous market, represented by nearly 8,000,000 Model T Fords, or a greater market than that of 1924. By the middle of 1929 there will still be about 7,000,000 Fords needing replacement parts and services.

"When 1930 comes along nearly 6,000,000 Fords of the present model will still be running, or a market equivalent to that of July, 1923. By June of 1930 the market will still have more Fords in use than the total of 1922, which was a banner year in the trade—the year in which many predicted that the saturation point for automobiles had about been reached.

"By January of 1931 we will still have about four million Fords in service, this number being reduced to about three million by the middle of that year.

"From these figures it can be readily seen that no one need worry about any substantial reduction in this business for some time to come. By that time a readjustment will have taken place."



New Oakland All-American Six four-door sedan. List price is $1,145, which compares with $1,195 for the same body model in the previous line

Oakland Out With Larger Model —the "*All-American Six*"

Engine has been increased in size, giving greater output at lower speed. Wheelbase lengthened 4 in. New type of torsional damper fitted. Prices are reduced.

By A. F. Denham

AN entirely new model, known as the All-American Six, has been announced by the Oakland Motor Car Co. As compared with the former Oakland 6-54 it has an engine of considerably larger piston displacement, smaller stroke bore ratio and greater power output, a clutch, transmission and frame of different design, and larger bodies.

The wheelbase of the new car (117 in.) is longer by 4 in. than that of the old one, but prices have been reduced, the reductions ranging from $30 to $100 for the different body types. The prices are as follows:

Sport roadster	$1,075
2-door sedan	1,045
Landau coupe	1,045
4-door sedan	1,145
Cabriolet	1,145
Landau sedan	1,265
Sport phaeton	Not announced

For the same car speed the engine turns over at a slower rate than the previous one, the rear axle reduction ratio having been lowered, still the performance is said to be improved as a result of the larger piston displacement.

The general appearance of the car has been materially improved by the use of lower and longer bodies and new fenders, and by increasing the hood length and redesigning the rear end.

With a bore of 3¼ and a stroke of 4¼ in., giving a piston displacement of 212 cu. in. and an N. A. C. C. rating of 25.35 hp., the new six-cylinder L-head engine delivers 60 hp. at 2800 r.p.m. The crankshaft is of the four-bearing type, and has counterweights forged integral with it. A new type of torsional damper, equivalent to two harmonic balancers, is now part of the fan pulley. Main bearings, which are of the interchangeable, bronze-backed, babbitt-lined type, are stepped in diameter from front to rear, thrust being taken by the front intermediate bearing. Following are main bearing sizes:

	Diameter	Length
Front	2-5/16	1-11/16
Front center	2⅜	1⅝
Rear center	2-7/16	1⅝
Rear	2½	2⅛

Crankpin bearings are 2¼ in. in diameter and 1¼ in. long. The total weight of the crankshaft is 78½ lb. Connecting rods are 9¼ in. long. They have the lower bearing die-cast in and the piston pin clamped in the upper end. Piston pins are 1-1/16 in. in diam-

eter and identical with those for the Pontiac engine. Since the bore of the new Oakland engine is the same as that of the Pontiac, the pistons also are identical in design. They are of semi-steel, with two 3/16 in. compression rings above the pin and one 3/16 in. oil scraper ring below, the total length of the piston being 4-1/16 in.

Nickel steel (S.A.E. No. 2330 or 3140) is used for the intake valves, which are of 1⅝ in. outside and 1½ in. clear diameter, while silicon-chromium steel is used for the exhaust valves, of the same dimensions. Tappets are identical in design with those on the 6-54 Oakland, but the valve guides have been increased in length to 3⅜ in. The valve springs, which are ½ in. longer than formerly, have the upper coils closed, which is said to dampen vibration.

The camshaft is considerably heavier than in the previous Oakland engine and is supported in four bearings with gray iron, replaceable bushings. Bearing diameters are stepped, the dimensions being as follows:

	Diameter	Length
Front	2-3/16	1⅜
Front center	2-5/32	1⅛
Rear center	2⅛	1⅛
Rear	1½	1¾

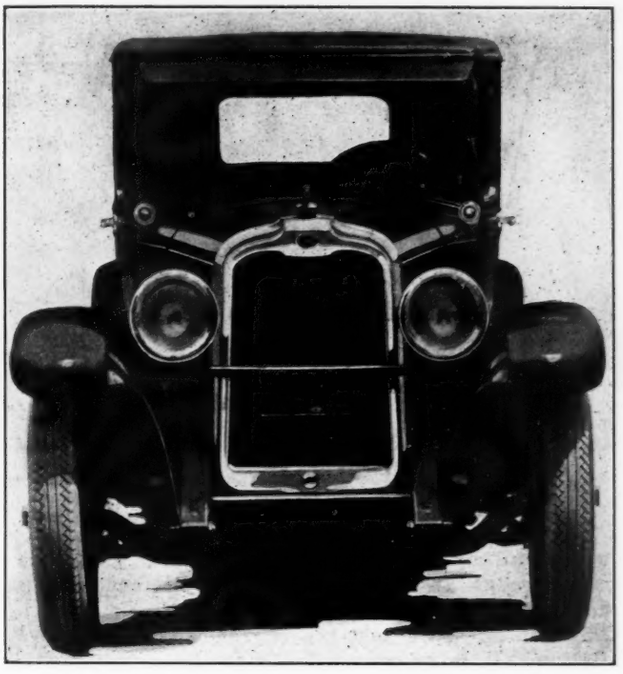
A gear is mounted on the center of the shaft for the distributor and oil pump drives. The accesories drive shaft runs transversely of the engine, and at an angle to the horizontal, so that the distributor is at the left side of the engine and slightly above the camshaft, while the external oil pump is a little below the shaft and at the right side of the engine.

Front end drive is by means of a 50-link chain of 1½ in. width and ½ in. pitch. The V-type fan belt is used to drive both generator and water pump, which latter is mounted in the cylinder block back of the fan.

Cylinder block and crankcase are cast integrally, the crankcase being carried 2¾ in. below the center line of the crankshaft. The cylinder head is detachable and the usual pressed steel oil pan is used. An interesting new combustion chamber is used, having three convex walls. The spark plug is located near the center of volume of the head, and recessed from it. Absence of any detonation tendency is claimed for this design. The compression ratio is 4.8.

Lubrication is by pressure feed to main, connecting rod and camshaft bearings as well as to the chaincase. Piston pin and cylinder walls are lubricated by splash from vents in the connecting rod lower bearings. An oil return is provided in the system which enables oil to return to the pump in cold weather without passing through the oil pump screen. An oil filter is provided in addition to the large screen in the crankpan, and a new crankcase ventilating system has been incorporated. This system combines pressure and suction ventilation. Air

The new Oakland instrument panel is highly decorative in design. Note the seven positions for the single level ignition and light switch



Front view of the All-American Six, showing new radiator shell, which is chromium-plated, and the full-crowned fenders. Chromium plating is also used on the lamp rims and most of the other exposed parts that are commonly nickeled

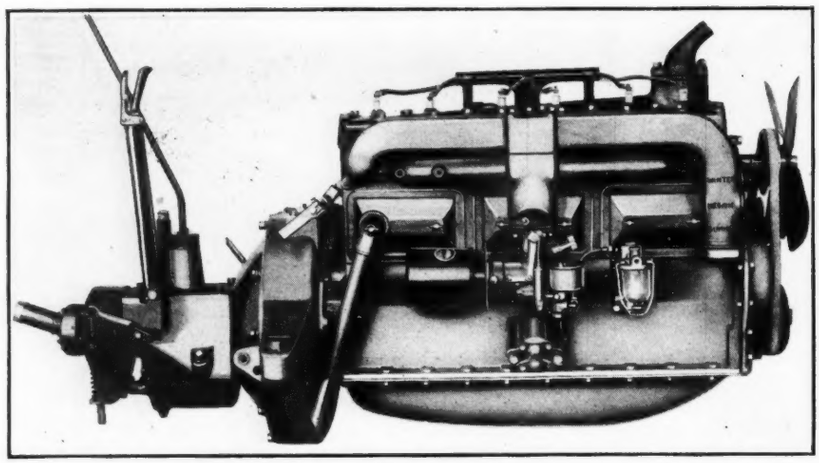
How New Oakland Model Was "Sold" to Dealers

A HIGHLY successful method of getting its new model "across" to the dealer organization was introduced by the Oakland Motor Car Co. before announcing the "All-American Six."

Seven groups were organized, each consisting of two factory executives. Each group was assigned a railway express car. In this car was loaded one of the new models, a complete stage setting, manufactured by a theatrical scenery company, a full supply of all new parts used, together with the parts they displaced, floodlights, etc.

With this equipment the various groups, by establishing a schedule similar to that of road companies, were able to cover the entire Oakland dealer organization of 3000. Exhibitions and lectures were arranged in the 25 principal distributing centers of the United States, each lasting two days. Distributors brought in the dealers from contiguous territory for these two days, and the factory was able to get the whole story, from a sales, manufacturing, advertising, and service angle before each dealer.

Meetings were held in the best available place. Wherever dealers' showrooms were not equipped to handle such a showing, theaters, hotel ballrooms — and even, in one case a synagogue—were used for the meetings.



Right side of Oakland engine, showing AC fuel pump and strainer, external oil pump, crankcase ventilating outlet pipe and forward leading exhaust manifold

is forced in by fan pressure at the front of the crankcase through an air cleaner of the filter type. The outlet is at the rear of the engine, turned back, so that the air draft past the engine will aid the ventilation. It is recommended that the crankcase oil supply be renewed once every 2100 miles or every two months in summer and once every 1000 miles in cold weather. The oil pump being mounted in an inclined position, it is self-priming, since any oil in the passages will drain back into the pump when the engine is stopped.

Up to around 30 miles per hour, there is no thrust on the thrust collar of the water pump shaft. A thermostat is built into the cylinder head. The water capacity of the Harrison radiator and the cylinder block is 14 qt. A Durex bushing is used to support the water pump impeller shaft; this requires lubrication only every 5000 miles.

A three-port intake manifold is used in conjunction with a 1-in. vertical type Marvel carburetor. The exhaust manifold is provided with a valve which can be set in any one of three positions. The intake manifold is jacketed by the exhaust manifold in such a way that when the exhaust control valve is set in the "Winter" position the incoming charge is heated by the exhaust from all cylinders; when in the "Summer" position, the hot spot is inoperative, while in the "Medium" position one-half of the exhaust passes out directly through the manifold and half of it flows through the intake jacket.

The exhaust manifold is of the front down-take type, the gases passing to the front of the engine, down and back.

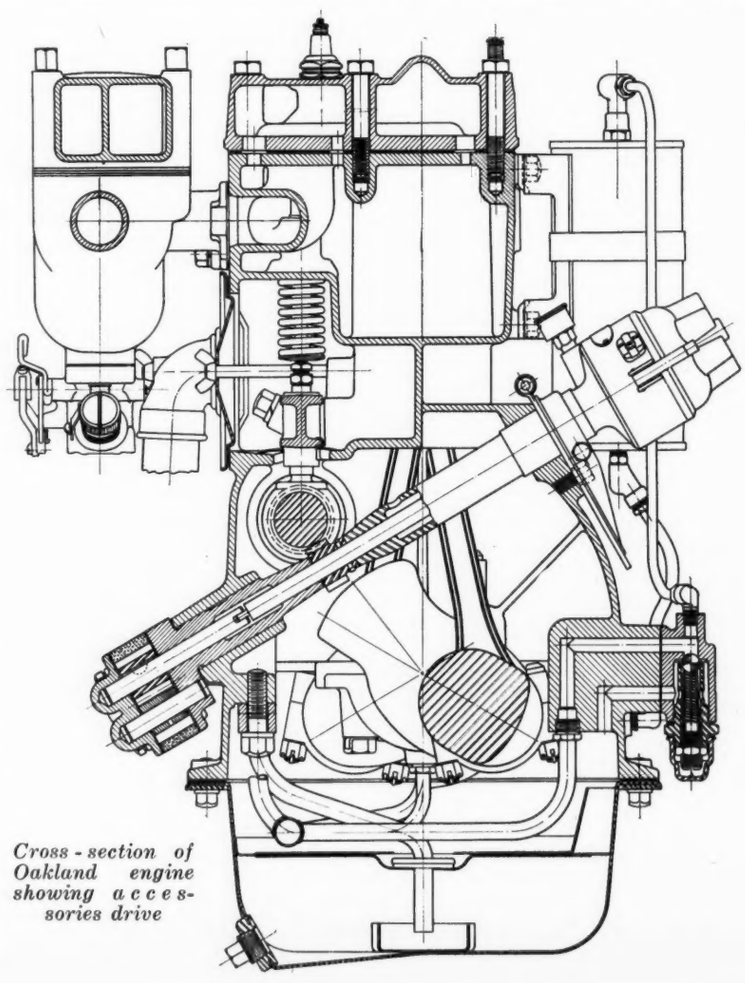
Oakland is pioneering the adoption of the AC fuel pump, which in this installation is driven from the camshaft. In conjunction with this pump a visible type gasoline filter is used. An AC air cleaner is also standard equipment. The gas tank holds 13 gal.

Three-point engine support is employed, with the rear supports mounted in rubber washers. A separate truck type flywheel housing is used, supporting the unit clutch and transmission. The clutch is of the single-plate self-adjusting type, its facings being 5/32 in. thick, of an inside diameter of 5½ in., and an outside diameter of 8⅞ in. When driving in gear the clutch throwout bearing does not rotate in this design.

The three-speed transmission is conventional in design. A Hyatt roller bearing is used at the front of the main shaft, the rear being supported by a ball bearing. The main drive gear bearing is somewhat larger than on the previous Oakland, and a flexible drive is provided at the rear of the main transmission shaft. The countershaft gear cluster is forged from a single block of chrome vanadium steel and runs on bronze bushings on the stationary countershaft. The main shaft of the transmission now has 10 splines instead of six.

Mechanics Machine Co. metal universal joints are used. The rear axle is semi-floating and similar to that previously used. The rear axle gear reduction has been lowered from 4.7 to 4.45 to 1. Gears having a 5.2 to 1 reduction are offered as special equipment through dealers. As a result of the decrease in the axle ratio, the engine speed has been materially decreased. For instance, at 35 m.p.h. the engine turns at only 1790 r.p.m. The maximum car speed has also been materially increased.

Delco-Remy electrical units are used. As mentioned, the new distributor is located on the side of



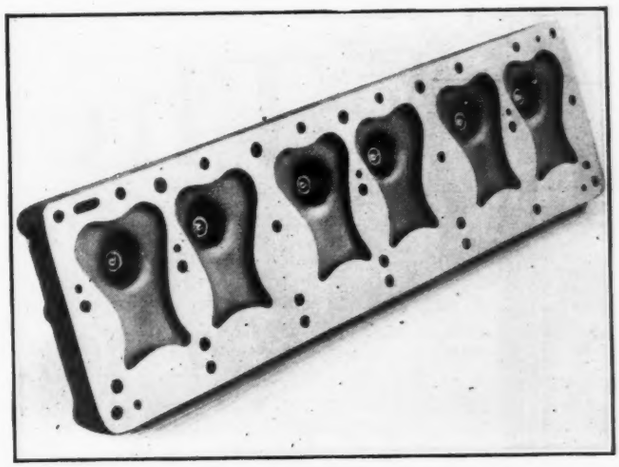
Cross-section of Oakland engine showing accessories drive

the engine where it does not have to be disturbed when the cylinder head is to be removed. It is of the full automatic type and is provided with a scaled lever adjustment making advancing or retarding spark for summer or winter driving a very simple operation. The generator is of the third-brush type. Eclipse Bendix starter engagement is used, entirely inclosed within the clutch and flywheel housing. Double filament Tiltray headlights with chromium-plated rings are used. These are operated through a switch on the floor board of the driving compartment. Cowl light arms are also chromium plated, as are the radiator shells and door handles on the sport models. A spark plug wire manifold has been added.

The knuckle arm to which the drag link connects has been redesigned and is now separate from the tie rod arm. Tapered joints on the steering arms have been increased in diameter for greater rigidity. Service brakes are of the external four-wheel type, with 12⅜ in. drums, 1⅞ in. wide. As formerly, the Perrot control is used on the front brakes, to release the outside brake when turning. The parking brake is mounted on the transmission shaft immediately back of the gearcase, and has a 6-in drum, taking 2½-in. lining. The ratchet and pawl arrangement on the parking brake lever is more rigid than formerly.

Wood wheels of 19-in. diameter are standard, together with 29 by 5.50-in. tires. A feature of the original equipment is that tire and tube assemblies are marked for proper valve location so as to insure perfect balance when they are mounted on the balanced wheels and rims.

The steering gear is substantially the same as on the former Oakland, being of the screw and nut type with 15 to 1 reduction. The frame, however, is of entirely new design. It is characterized by a kick-up over the rear axle which ends in a downward sweep at the rear of the chassis allowing an additional 1½ in. for height of rear body construction. Side rails have been made stiffer by increasing the depth ½ in. and the width of the flanges ¼ in. Heavier cross members are used and the length has been increased on account of the increase in the wheelbase.



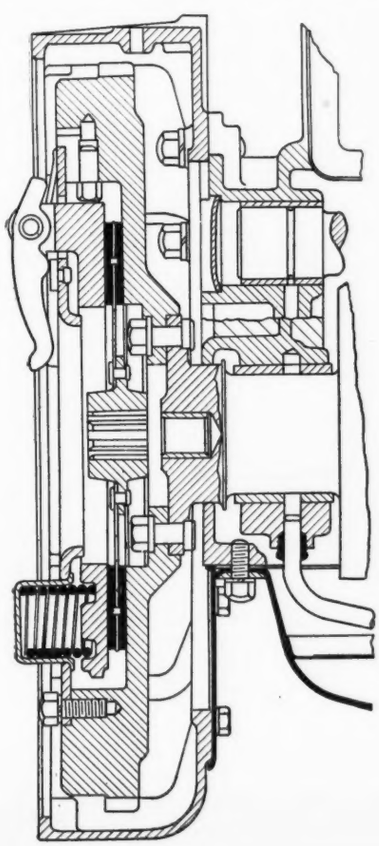
Peculiar form of compression chamber in the new Oakland engine

By reducing the number of leaves in the front springs from 12 to 8 it has been possible to further lower the bodies. Length and width of front springs remain as formerly. Rear springs, however, have been increased in length 2 in., now being 54½ in. long and 2 in. wide. Silico manganese steel is used for the rear springs.

Full crown fenders, narrow front pillars and lower and more sweeping lines characterize the new bodies. The sedan and the landau coupe are upholstered in mohair, while Spanish leather is used for the open models and the cabriolet.

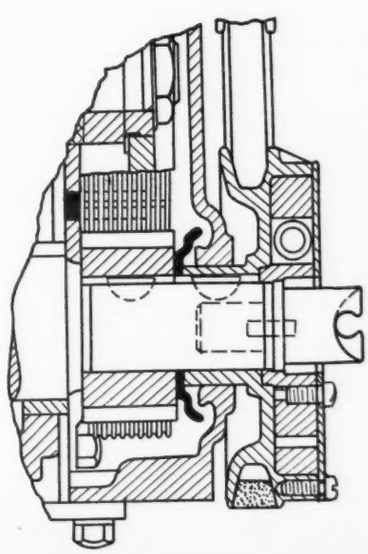
An attractive new instrument panel has been developed containing three groups of instruments, each surrounded by an ornate oak-leaf design engraving.

Individual features of the various body models are, English-type side curtains on the roadster, horizontally-folding windshields on the open models, felt-packed pedals on the closed models, ornamental filler caps on all models, and starter button shifted to toe-board. Fisher V-V windshields are used on all closed models. Chromium plating is used on radiator shells, lamp rims, hood latches, side arms of open car windshields, door handles of open models, and front and rear bumpers. The latter are standard equipment on the landau sedan and sport roadster. Automatic windshield wipers, rear view mirrors, stop and backing light, and dash gasoline gage are standard on all models. Sun visors are furnished on all closed models. Trunk racks are standard on both the phaeton and the roadster. All sedan models have leather-covered smoking sets, the landau sedan, in addition, having arm rests in the rear compartment. All closed models are fitted with door locks.



At left—Section of the new Oakland single plate clutch

Below—New torsional vibration damper combined with fan-belt pulley



The Quest *for*

Striking Proper Balance Between Performance and Endurance is Problem Confronting Manufacturers of Moderate Priced Cars

By P. M. Heldt

ONE line of development that has been followed rather persistently since the beginning of the automobile industry is that toward higher piston speeds. The engines on the earlier experimental vehicles generally gave their maximum powers at speeds of revolution which corresponded to 500-600 ft. p.m. They were unduly heavy, however, and the ability to run at higher speeds was developed rapidly. In 1904 the average piston speed of 73 American automobile engines was 778 ft. p.m. In 1907, when the L. A. A. M. horsepower formula was adopted, which is supposed to give the horsepower at 1000 ft. p.m. piston speed, this latter was evidently close to the average. Piston speed continued to move upward, but not as rapidly in this country as abroad, where automobile racing had more influence on sales and on design than it had here. Quite an advance was marked by the appearance of the eight-cylinder Cadillac in 1914. This engine gave its maximum output at slightly over 2000 ft. p.m., which was about one-third higher than the average piston speed of other passenger car engines in this country at the time.

Present-day automotive engines may be divided into four classes with respect to piston speed. The slowest are those used for heavy trucks and tractors, which are also used to a certain extent for industrial work. Next comes the four cylinder passenger car engine. This is followed by the six and eight cylinder passenger car engine, and finally comes the modern supercharged racing engine. Average piston speeds of the four classes are about as follows:

Truck and tractor engines	1300 ft. p.m.
Four cylinder passenger car engines	1600 ft. p.m.
Six and eight cylinder passenger car engines	2200 ft. p.m.
Racing engines	3400 ft. p.m.

The spreads between the different classes appear larger when the speeds are given in revolutions per minute, for the reason that the low speed engines have longer strokes than the high speed engines. A comparison of the four classes on the r.p.m. basis is given in the following table.

Four cylinder truck and tractor engines	1050 r.p.m.
Four cylinder passenger car engines	2250 r.p.m.
Six and eight cylinder passenger car engines	2800 r.p.m.
Racing engines	6800 r.p.m.

The chief object of increasing the piston speed or the speed of revolution is, of course, to obtain greater power from an engine of given displacement, and, therefore, from a given engine weight. How the output per unit of displacement is increased by increasing the piston speed is clearly shown by the following tabulation, which gives the reciprocal values, the displacements required to produce one horsepower. The figures given are averages for practically all engines of each class now on the American market. To produce one horsepower requires—

11 cu. in. in truck, tractor and industrial engines of over 500 cu. in. displacement.
6 cu. in. in four cylinder passenger car engines
3.75 cu. in. in six and eight cylinder passenger car engines
0.59 cu. in. in supercharged racing engines.

These figures, in connection with the average revolutions per minute enable us to calculate the average brake mean effective pressures obtained in the different classes of engine. With a brake mean effective pressure P, the work done by a displacement under pressure of one cubic inch is evidently P/12 ft.-lb. If the engine makes N revolutions per minute, we have this displacement N/2 times per minute, making the work done per cubic inch displacement per minute.

$$P/12 \times N/2 = PN/24 \text{ ft.-lb.}$$

Now, if it takes D cu. in. displacement to produce one horsepower, since the latter is equal to 33,000 ft.-lb. per minute, we have

$$DPN/24 = 33{,}000$$

and

$$P = 792{,}000/DN$$

Inserting in this formula the values of D and N for the different classes of engine given in previous tabulations, we obtain the following average brake mean effective pressures for engines of the different classes:

68.5 lb. p. sq. in. for truck tractor and industrial engines of over 500 cu. in. displacement
59 lb. p. sq. in. for four cylinder passenger car engines
76 lb. p. sq. in. for six and eight cylinder passenger car engines
197 lb. p. sq. in. for supercharged racing engines.

The gain in output per unit of displacement with

Higher Piston Speeds

speed is quite remarkable. This, however, is not identical with the proportional gain with speed on the basis of weight, for when the speed is materially increased the weight per unit of displacement does not remain the same. This is due in part to the fact that in the high speed engine, not only the crankshaft but also the crankcase must be made more rigid, because the increased loads on the crankshaft are transmitted to the crankcase. Furthermore, the increase in speed has been accompanied by a decrease in cylinder sizes and it is impractical to decrease wall thicknesses in proportion to the linear dimension of the cylinder. An investigation made by the writer some time ago showed that for the same class of construction the weight per cubic inch of displacement had increased about one-third since 1910. During the same time the average piston displacement probably slightly more than doubled.

The Two Extremes

The lowest speed passenger car engine at present built develops one horsepower for a little less than 9 cu. in. displacement, while the highest speed racing car engine develops one horsepower for approximately one-half of one cubic inch displacement. This is an enormous gain, which, of course, cannot be obtained without cost. It is only by studying this cost and comparing it with the gain that we can properly judge the relative values of high and moderate speeds and form a sound idea as to the probable future trend with respect to engine speeds.

If we take an engine designed to operate at moderate speed and try to make it run at higher speed we run up against three difficulties, viz.: (1) The volumetric efficiency falls off very rapidly, and with it the mean effective pressure produced in the engine; (2) the various dynamic forces on moving parts, which are proportional to the square of the speed of rotation, increase rapidly and cause the frictional losses to increase; (3) by increasing the speed range, more of the critical speeds of the crank assembly are likely to be brought within this range and trouble from roughness of operation is almost certain to be increased.

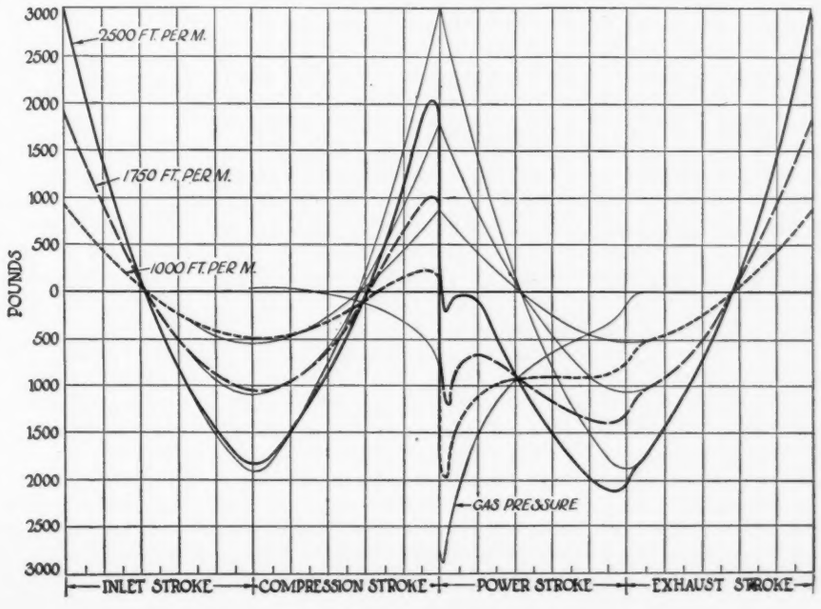
By changes in design we can, to a certain extent, control these adverse factors. Thus by enlarging the valves and increasing their lift we can maintain the volumetric efficiency up to a higher speed. But larger valves and greater lifts have their disadvantages. An increase in the size of a valve makes it more difficult to cool effectively; it means a heavier valve, which since the impact of the valve on its seat and the impact of the cam follower against the valve stem depend on the mass of the valve, means a noisier valve. Finally, the heavier the valve, the higher its lift and the greater the speed of the engine, the stronger must be the valve spring. It is necessary to work the material of the springs at a higher stress, and this may call for better spring material than the ordinary carbon spring steel. In brief, valve troubles and spring troubles are more serious factors in a high speed than in a low speed engine, unless higher grade materials and better workmanship are used, or in other words, unless more costly methods of construction are resorted to.

When the practical limit of valve sizes and lifts have been reached there is still one other step which can be taken to increase volumetric efficiency at high speeds, and that consists in the use of four valves per cylinder. However, manufacturers do not seem to be inclined to resort to them for stock cars at the present time. When supercharging is used, as in practically all modern racing engines, the limit to speed set by the volumetric efficiency factor is so far removed that it can be neglected and the only limits that remain are those due to stresses and power losses caused by the dynamic forces and unpleasantly rough operation of the engine.

Inertia forces on the reciprocating parts increase in proportion to the square of the speed, and so do the centrifugal forces on rotating parts, such as the connecting rod head. The increase in both forces results in increased bending moments on the crankshaft, and to resist these the crankshaft must be made larger in diameter.

Considerations of smoothness of operation also call

Fig. 1—Showing influence of piston speed on resultant force in cylinder axis



for heavier crankshafts in the case of high speed engines. A crankshaft of a particular design, with pistons and connecting rods of given weight attached, has a definite frequency of torsional vibration and will perceptibly vibrate torsionally — unless damping means are provided—if one of the lower harmonics of the gas pressure corresponds in frequency to the natural frequency of the shaft. The frequencies of the various harmonics of the gas pressure naturally vary in direct proportion to the engine speed, and the simplest method of obviating trouble from torsional vibration consists in making the natural frequency of vibration of the crankshaft so high that even at the highest engine speed the lowest harmonic of the gas pressure for which there is phase equality on all of the cranks—and which usually has the greatest amplitude—does not reach the natural frequency of the shaft, so that synchronism is prevented. Even the second harmonic is generally close to the limit of the working speed of the engine and therefore cannot cause much trouble. But if we increase the speed range of the engine we approach the frequency of the lower harmonics of the gas pressure curve to the critical speed of the crankshaft and therefore increase trouble from this source, that is roughness of operation.

Increase Shaft Diameter

To prevent such trouble we must increase the shaft diameter and thus raise the natural speed of torsional vibration of the shaft.

The critical speed varies substantially as the square of the crankshaft diameter, and, therefore, if the speed range of the engine is increased, and it is desired that the relation of the different critical speeds to the speed range remain the same, the crankshaft diameter must be increased in the proportion of the square root of the speed increase. Actually the diameter should increase somewhat faster than the square root of the speed, for the reason that when the main journals are increased in diameter the crank pins and crank arms are also increased in size and this adds to the vibrating mass. The magnitude of this influence has to be estimated, but it is probably not far wrong to assume that in order to keep the relation between different critical speeds and the speed range the same, the crankshaft main bearing diameter must vary about as the 0.6th power (instead of the 0.5th) of the speed. Therefore, if the speed of the engine is doubled the crankshaft diameter must be increased in the proportion of (roughly) 1.5 to 1.

One of the most serious results of an increase in engine speed is the accompanying increase in inertia and centrifugal forces. If the reciprocating and rotating weights remain the same, then these forces increase as the square of the speed, and, therefore, much faster than the power. These forces subject the members on which they act, and adjacent members, to additional stresses, and by increasing the loads on the bearings, they add to the frictional losses. Considering for the moment only the inertia forces, they depend chiefly on the speed of rotation, increasing as the square of this factor, and also on the length of stroke and the mass of the reciprocating parts. If the speed is to be increased, the only way in which the inertia force can be kept down is by reducing the mass of the reciprocating parts.

In the higher speed engines the reciprocating parts therefore must of necessity be lightened. As regards the pistons, this can be done either by cutting down the thickness of the skirt to a minimum and reducing the length, or by casting the piston of light alloy. As regards the connecting rod, its weight can be lessened by making it of alloy instead of carbon steel and by machining it all over. All of these changes from conventional practice for moderate speed engines involve additional cost, the lightening of the piston skirt section because it results in a greater number of rejects.

There are, of course, limits to the reduction in weight of both piston and connecting rods, and with very high speed engines the inertia forces and consequent bearing loads will inevitably be higher. A comparison of the inertia forces corresponding to different engine speeds has been made in Fig. 1. A 3½ by 4 in. engine is assumed, and the inertia forces are calculated for three speeds of revolution, corresponding to 1000, 1750 and 2500 ft. p.m. piston speed respectively. In the low speed engine no attempt would be made to bring down the reciprocating weight to the minimum, and for this engine this weight is taken at 4.5 lb., while for the medium speed engine it is taken at 3.75 lb. and for the high speed engine at 3 lb. The light curved lines in the diagram represent the inertia forces during the periods when there is no appreciable gas pressure in the cylinder, and the gas pressure on the piston, while the heavy curved lines represent the resultant of the gas pressure and the inertia force. It is immediately apparent that the resultant force along the cylinder axis is much greater at higher speeds. It is this resultant force along the cylinder axis which principally determines the loads on the engine bearings.

At very high speeds it is difficult to prevent the bearings—especially the crankpin bearings—from overheating. The generation of heat at the bearings depends upon the rubbing speed and also upon the load on the bearing. When the engine speed is increased, that in itself increases the rubbing speed. The latter is further increased by the fact that if the engine is to be run at materially higher speed its crankshaft and crankpin bearings must be made larger in diameter. Finally, the load on the bearing is increased by the increase in the inertia forces.

The crankpin bearing load also depends to a considerable extent upon the centrifugal force on the connecting rod head, which also increases as the square of the speed of rotation. In this case, too, the only means of keeping down the force is by lightening the member, and a considerable improvement has been made in this respect by spinning the babbit lining directly into the head instead of fitting removable bearing shells. This is probably the only instance where lightening of the moving parts has not resulted in increased cost. The spun-in bearing has the further advantage that there is no break in the path of heat flow from the bearing surface to the metal of the rod.

Nowhere Near the Limit

From the above discussion the conclusion may be drawn that by running engines at higher speed, greater output may be obtained from an engine of given weight, and the results obtained with racing engines show that even with the most advanced stock engines we are nowhere near the limit of specific output. The higher output per unit of engine weight permits of building cars of greater accelerating power (better performance), higher maximum speed, and greater flexibility.

However, engines capable of operating at very high speeds and standing up under these speeds are more difficult and expensive to manufacture, and beyond a certain speed it is impossible with our present resources to obtain the same degree of reliability that is customarily obtained in moderate speed engines. Whether or not such speeds are worth while from the manufacturer's standpoint then depends upon the particular requirement of the clientele he is catering to. If they want "performance" above all else and are willing to

pay for it, then the higher the engine speed the better the engine will suit them. However, extraordinary performance can be combined with reliability and durability only at great expense, which places cars of this type beyond the reach of large numbers of buyers. Purchasers of popular priced cars cannot expect both unsurpassed performance and long life, and the logical thing for those who can afford to pay only a moderate price is to accept a somewhat lower standard of performance.

Manufacturers of moderate priced cars realize this situation, and they are confronted with the problem of striking a proper balance between performance and endurance or life, which is largely a matter of piston speeds. The solution is a difficult one, as the factors on which it must be based cannot be definitely formulated. Perhaps the only thing definite that can be said on the subject is that it is logical to use lower piston speeds in low priced than in high priced passenger vehicles.

There is, of course, another aspect to the problem, and that is based on the fact that all progress in engineering matters results from overcoming difficulties. It is desirable to increase engine speeds because of the advantages of high speed operation, and for that reason effort will be directed toward the elimination of the difficulties attending such operation and the production of engines capable of operating at high speeds. In fact, it has seemed for a long time that the most rational way of progress in automobile engineering was to make available at lower cost the features already found in the higher priced cars, so that more could enjoy them.

At the time when cylinders were still cast singly, six and eight cylinder engines seemed intolerably complicated machines, but by the development of the block-casting system and of such machine tools as continuous millers, multiple spindle boring machines and multiple spindle drill presses the cost of production of such engines has been brought down to very reasonable figures. So, no doubt, methods will be developed which will make it possible to produce high speed engines that are reliable and durable at less cost than is possible at the present time, and thus increase the natural field for this type of engine.

Books for the Business Bookshelf

Training Efficient Foremen

Foremanship. Glenn L. Gardiner. A. W. Shaw Co., Chicago. 680 pp., Illus. $6.

THE importance of foremen in industrial organizations has been rapidly increasing during recent years as it has become realized that, regardless of the efficiency of the "higher-ups," unless the foremen are properly trained and fitted to carry on the management's policy the net results of operation are adversely affected. In this book, written by a former director of foremanship development of Oakland Motor Car Co., a rather comprehensive study of foremanship problems is presented. Such matters as material handling, collecting and using cost records, safety work and many other phases of general shop management are included in the things the author believes foremen should understand in order to make their work most effective.

Considerable space is devoted to means of developing foremen through special classes, foremen's clubs, etc., while another section of the book is given over to the discussion of some of the very practical problems, such as planning the day's work, handling men, adjusting wage disputes, etc., with which every foreman is confronted during his working hours. Either for foremen themselves or for those who are interested in the development of foremen, this book should be of real value, not only for its theoretical discussions of the subject but for the very practical suggestions on all sorts of problems which it contains.

The Sales Problem

Directing Sales. H. C. Bonney. The Ronald Press Co., New York. 121 pp. $3.

THIS book, according to the author, undertakes to give a comprehensive view of the fundamentals of the sales problem, the big questions which especially concern the executive in charge. These problems include formation of territories, development of the inside sales force, hiring and paying salesmen, training salesmen and advertising fundamentals. These subjects are all discussed rather briefly. While the discussions are interesting, the reader who has kept abreast of modern sales literature may be hard put to discover anything of striking originality in the present volume.

Studying Time and Motion

Time and Motion Study. Stewart M. Lowry, Harold B. Maynard and G. J. Stegemerten. McGraw-Hill Book Co. 377 pp. Illus. $4.

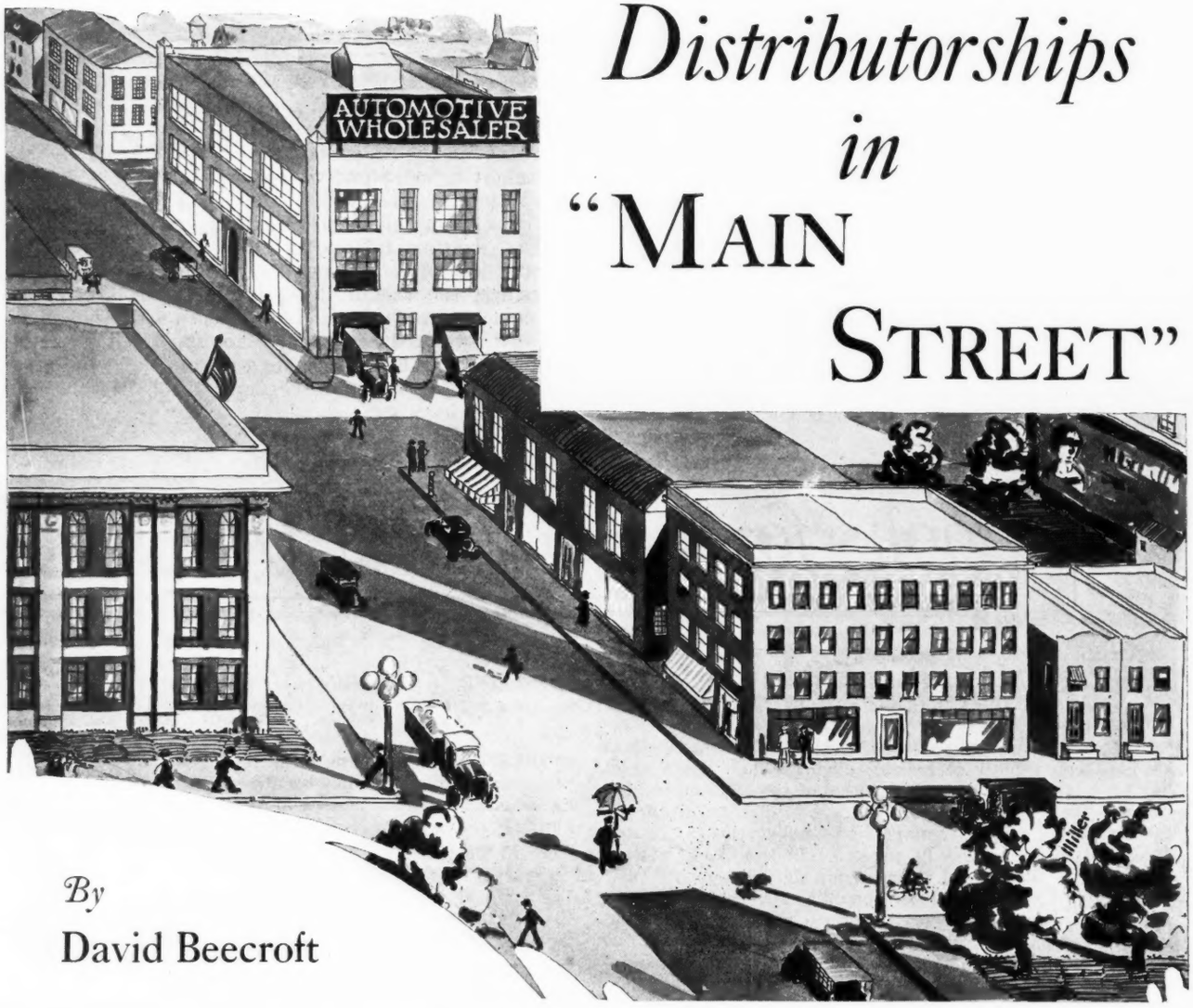
SINCE time study was first introduced by Dr. Taylor many years ago it has been adopted to varying extents by a great many industrial organizations. Too often, however, have the adopters failed to give sufficient consideration to the motion study part of the problem and it is largely through the work of the Gilbreths that this part of the process of accurately determining wage rates has attained its full importance. The task of making a time study which will provide the management the greatest amount of useful informatian is no easy one, as a glance through this book will quickly disclose. But there is little doubt in the minds of most modern executives that accurate time studies are well worth their cost. Analysis and standardization of the job are essential prerequisites to good time studies, and when the times have been taken the task is only just started. This book provides a very complete and useful manual for carrying on this important work of management in the most useful way and the material on formula development by means of which much of the arduousness of time study may be eliminated is particularly valuable.

Business in Politics

Business in Politics. Charles Norman Fay. The Cosmos Press, Cambridge, Mass. 174 pp. $1.

ANOTHER voice crying in the wilderness! Mr. Fay pleads for entrance of business men into politics in order that our local and national governments may be operated with the efficiency, integrity and greater benefit of the people that he believes to be true of Big Business. Incidentally, he expresses his distrust of organized labor, Sovietism, professional politicians and various other members of our body politic and emphasizes his belief in the business men of the country as being eminently capable of working out the country's salvation. Readers with liberal tendencies will possibly find no difficulty in picking flaws in many of his arguments, but Mr. Fay evidently is sincere in his beliefs and expresses them emphatically.

Trade Buying Habits Create Necessity for *Distributorships in* "MAIN STREET"



By
David Beecroft

A Picture of Distribution for Manufacturers

THE buying practices of the car dealers, garages and repair shops in this study constitute a picture of distribution which is recommended to manufacturers for close study. The various percentages and figures have set forth habits of buying facts that do not admit of argument but provide material for study.

The reasons that have prompted these practices are generally found in the demands of the vehicle owners or operators for a better character of service.

Another strong influence has been the necessity, on the part of the car dealer, garageman or repair shop owner to round-out his business so as to meet the wishes of his customers.

This is the second and last instalment of Mr. Beecroft's article. The first instalment appeared in last week's issue.

IN an article last week we discussed in a general way, and illustrated by means of maps and charts, the results of a recent survey of automotive trade buying habits in seven Ohio counties. It was shown that in each of these counties, which were selected because of their relative remoteness from large cities, there has developed a well-defined tendency on the part of dealers, garages and repair shops to buy their supplies near home. Such materials as replacement parts, starting, lighting and ignition equipment, brake lining, accessories and shop tools are purchased in the main from distributors within a 50-mile radius. This means that thriving distributors may be found today doing business in small towns which have not heretofore been considered by many manufacturers as important distribution centers for their products.

This week we go into a more detailed study of the facts developed by the survey.

In the buying of chassis replacement parts in the seven counties—Athens, Champaign, Coshocton, Crawford, Guernsey and Ross—four factors stand out prominently.

First is the dominance of the near-home buying habit—78.4 per cent of the buyers purchase within a

Ohio survey shows many small towns have become of major importance as distribution centers due to tendency of retailers to buy supplies near home.

radius of 50 miles. A more complete analysis of purchasing shows the following:

18.6%	buy	locally	(in	their	home	town)	
20.6%	"	at	an	average	of	10.1	miles
18.6%	"	"	"	"	"	24.7	"
20.6%	"	"	"	"	"	44.3	"
11.3%	"	"	"	"	"	61.7	"
6.2%	"	"	"	"	"	81.7	"
4.1%	"	"	"	"	"	141.3	"

Some of the long-distance buying is because of motor car dealers buying from their respective car distributors in distant cities.

Near-home buying is perhaps best indicated by such centers as Coshocton and Cambridge, which occupy an intervening space between Columbus, Canton, Wheeling, W. Va., and Parkersburg, W. Va. In this intervening zone several other cities are coming into the wholesale picture as there is buying of replacement parts in Mount Vernon, New Philadelphia, Newark and Zanesville, all grouped in this area.

Coshocton and Cambridge rank in sixth and seventh places as parts-buying centers for the seven counties. Coshocton dominates the buying in its county and Cambridge has one-third of the buying accounts in its county. The following tabulation showing the number of retailers buying replacement parts in different cities provides a concise picture of how the wholesaling of parts has spread into smaller cities that supply the near-home demand.

Columbus	20	Purchasers
Chillicothe	12	"
Dayton	11	"
Logan	10	"
Galion	7	"
Cambridge	6	"
Coshocton	6	"
Canton	5	"
Zanesville	4	"
Lima	3	"
Wheeling, W. Va.	3	"
Mansfield	2	"
Mt Vernon	2	"
Toledo	2	"
Huntington, W. Va.	2	"
Lancaster	1	"
Athens	1	"
Philadelphia, Pa.	1	"
Defiance	1	"
Cleveland	1	"
Ft. Wayne, Ind.	1	"
New Philadelphia, Ohio	1	"
Decatur, Ind.	1	"
Urbana, Ohio	1	"
Newark, Ohio	1	"
Portsmouth, Ohio	1	"

This tabulation is significant in that a city like Chillicothe, which is normally regarded as a third-line city in automotive distribution,[1] ranks second in the number of purchasers in this study.

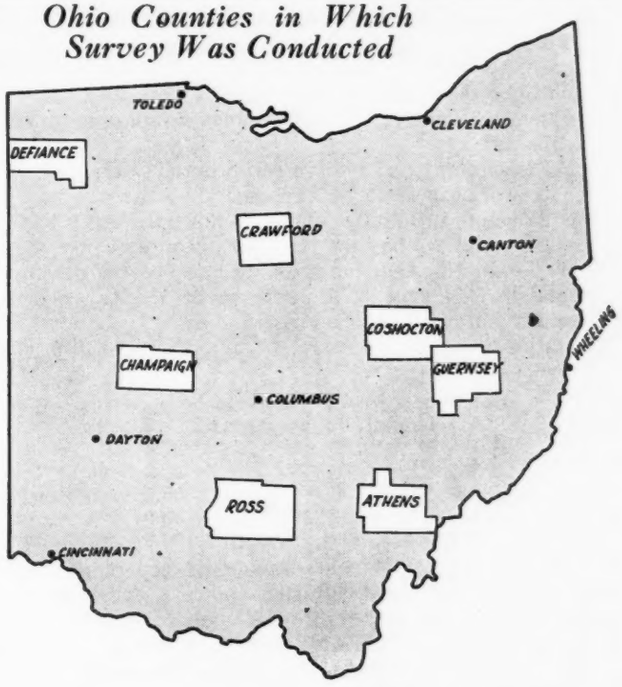
Logan also ranked as a third-line city, holding fourth position in the buying of these seven counties; and Cambridge and Coshocton are other surprises. On the other hand, big distributing centers, such as Cleveland, Canton and Cincinnati, are very small factors.

Some of the newer centers where automotive retailers report they are purchasing parts are Mount Vernon, New Philadelphia, Newark, Athens and Urbana. The springing up of these centers is unquestionably the result of the urge from the car owner for the quickest possible repair work, which means that the retailer is buying his parts at the closest available point.

The second factor that stands out is the great number of car dealers, garages and repair shops buying parts, 90 per cent of them buying and so being in the general repair business. This is supporting evidence of the fact that repair work, even to the extent of overhauling and rebuilding, is being done at the cross-roads. This also is a reflection of the fact that 48 per cent of the vehicles are owned and serviced in places of 5000 population or less. To the manufacturer these facts convey but one message, namely, the necessity of reaching 90 per cent of the retail outlets if he is going to aim at 100 per cent of the repair field.

The third important factor is the selection in buying —72 per cent of the car dealers, garages and repair shops buying from one wholesaler each. A desire for

Ohio Counties in Which Survey Was Conducted



Counties	Vehicle Population	Pop.—Vehicle Ratio
Athens	9421	5.3
Champaign	6679	3.8
Coshocton	7440	3.9
Crawford	9787	3.7
Defiance	6463	3.8
Guernsey	8534	5.3
Ross	6619	4.3

simplified buying is unquestionably responsible for this, in that replacement parts are not stocked in advance to any extent but are ordered very largely as the repair jobs come along, which means that the telephone and the telegraph are important factors in this business. It simplifies the work if all of the needed parts can be purchased in one place—there is only one telephone call, one telegram or one special delivery letter and only one delivery package for the order.

And finally the fourth factor—the many wholesale cities—the 100 retailers buying from 50 different wholesalers located in 26 different cities. The explanation for 26 different wholesale cities is merely one of convenience to the buyer. His policy is to buy at the closest point provided he can get the parts of desired quality. Nearness of location has the other advantages mentioned earlier, that it gives an opportunity for personal contact with the wholesaler, saves freight or express and very frequently means delivery by motor truck. One thing is apparent from a study of the replacement parts map (July 23 issue) showing distribution for the seven counties, and that is the extent to which the buying is done in the smaller and newer centers and the very small precentage of buying done in the large first-line distributing centers, with the possible exception of Columbus.

Electric Repair Work

The most outstanding fact in connection with the buying habits of the car dealers, garages and repair shops in the seven counties is that 101 out of the 112 are buying repair parts for starting, lighting and ignition work, which means that electric repair work of this character is being done by 90 per cent of those who answered the question.

This would indicate that this character of work, which was formerly centered in automotive electric repair shops, has now spread, it is conservative to infer, to 90 per cent of the automotive retail outlets.

This is a natural development, in that the car owner prefers to get as complete service as possible for his car at one place, rather than being forced to go to half a dozen different places in the normal repair or upkeep of his car.

With so many automotive retail outlets doing electric repair work, it is to be expected that there would be a wide range in buying, and it is not surprising to find the 101 retailers buying from 49 different wholesalers. Here again the near-home habit has become definitely established in that 64.3 per cent of the car dealers, garages and repair shops buy these electric parts within 50 miles of home. A complete summary of the buying distances is given:

17.2%	buy	locally	(in	their	home	town)	
14.9%	buy	at	an	average	of	9.8	miles
16.1%	"	"	"	"	"	27.3	"
16.1%	"	"	"	"	"	41.2	"
25.3%	"	"	"	"	"	59.5	"
5.8%	"	"	"	"	"	83.0	"
4.6%	"	"	"	"	"	190.0	"

An analysis of the purchasing of repair parts for starting, lighting and ignition shows that no one city dominates in the distribution of such parts. Columbus with 17 accounts is in first place but is followed fairly closely by Dayton with 11 accounts, Zanesville, 10 accounts, and Chillicothe, 10. Here is a summary showing the number of buying accounts for these parts in the different cities:

Columbus	17	Accounts
Dayton	11	"
Zanesville	10	"
Chillicothe	10	"
Toledo	7	Accounts
Cleveland	5	"
New Philadelphia, Ohio	5	"
Athens	4	"
Defiance	4	"
Cambridge	3	"
Coshocton	3	"
Logan	3	"
Canton	3	"
Decatur, Ind.	1	"
Mansfield	1	"
Urbana, Ohio	1	"
Wheeling, W. Va.	1	"
Huntington, W. Va.	1	"
Detroit, Mich.	1	"
New York City	1	"
Lima	2	"
Galion	1	"

These figures indicate, in a general way, how widespread is the distribution of these electrical replacement parts; and a study of the answers, giving the names of the wholesalers purchased from, shows that these parts are not all being purchased from any one group of wholesalers, such as the automotive electric wholesaler, but rather are being purchased from the general automotive wholesalers, the replacement parts wholesaler and the specialty wholesaler as well.

Here are a few examples, showing the number of accounts that are buying from the different wholesalers, to indicate that no one group controls the distribution of such parts. The wholesalers are designated by a letter and not by a firm name:

Wholesaler	"A"	(Electrical)	9	Accounts
"	"B"	"	7	"
"	"C"	"	8	"
"	"D"	(Car Dist.)	6	"
"	"E"	(Rep. Parts)	5	"
"	"F"	(General)	6	"
"	"G"	(Electrical)	4	"
"	"H"	(General)	4	"
"	"I"	"	4	"
"	"J"	(Rep. Parts)	3	"
"	"K"	(General)	3	"
"	"L"	(Electrical)	4	"
"	"M"	"	3	"
"	"N"	(Rep. Parts)	2	"
"	"O"	(Electrical)	2	"
"	"P"	(General)	2	"
"	"Q"	"	2	"
"	"R"	(Rep. Parts)	2	"
"	"S"	"	2	"
"	"T"	(Electrical)	2	"

The remainder of the 49 wholesalers, from whom the electrical parts are purchased, divide evenly among electrical wholesalers, replacement parts wholesalers and general wholesalers.

It is to be expected that car dealers, garages and repair shops, in purchasing electrical repair parts, would buy as much as possible from a single wholesaler, and it is not surprising that 74 per cent of the 101 buyers should follow this practice.

The study shows that but 12 retailers buy from two wholesalers each; and that six retailers buy from three wholesalers each.

That the buying of brake lining is following very closely along the same lines as the buying of replacement and electrical parts is indicated by the fact that the buying is very general. The great majority of car dealers, garages and repair shops buy one brand of lining only and buy it from a single wholesaler. The near-home buying habit is well established.

Exactly 86 per cent of the car dealers, garages and repair shops in this study of seven counties buy brake lining, which indicates how general is brake service

with all automotive retailers. This is another reflection of not only the tendency but the established habit of all types of automotive retailers organizing to give as complete a program of car service as can be given.

The near-home buying habit is established by the fact that 57.7 per cent of these retailers buy within 50 miles of home. This is a slightly lower percentage than in replacement parts and electrical parts, and represents a figure midway between what might be designated as the replacement parts field and the accessory field, as 49.4 per cent of these retailers buying accessories buy within 50 miles of home. An analysis of the buying distances for brake lining follows:

19.2%	buy	locally	(in	their	home	town)	
15.4%	buy	at	an	average	of	10.6	miles
9%	"	"	"	"	"	28.6	"
14.1%	"	"	"	"	"	44.1	"
30.8%	"	"	"	"	"	61.9	"
7.7%	"	"	"	"	"	85.8	"
3.8%	"	"	"	"	"	171.0	"

The buying centers for brake lining coincide fairly closely with those for replacement parts, excepting in that the larger distributing centers have a greater percentage of the business in brake lining than in parts. Wholesale buying of brake lining is taking place in such newer wholesale centers as Coshocton and Cambridge and there is considerable buying in Galion, Mansfield and Chillicothe.

Buy One Make of Lining

It is significant that 60 per cent of the retailers buy only one make of brake lining and that the remaining buyers purchase two or three brands. This is undoubtedly because of the desire of the retailer to carry as small a stock as possible and to have as many turnovers a year as he can. It also indicates the influence of the retailer on the car owner in the sale of this product.

Brake lining distribution, so far as the seven counties are concerned, is not in the control of any one wholesaler or any one group of wholesalers, it being particularly noticeable that there is a very definite distribution through car distributors and car branch houses and also a very general distribution through replacement parts wholesalers.

A glance of the map (July 23 issue) showing the purchasing of accessories in the different wholesale centers indicates to what extent these are purchased by the retailers in the seven counties from wholesalers in such large centers as Columbus, Dayton, Canton, Cleveland, Toledo, Ft. Wayne, Ind., and Chillicothe. Here the near-home buying habit is not nearly so evident as in the replacement parts field due to the fact that the retailer can purchase accessories in volume and carry a stock which he cannot do to advantage with many items in the replacement parts field. Notwithstanding this, near-home buying is making itself felt, particularly in a third-line distributing city such as Chillicothe, where nearly 50 per cent of the local retailers buy from a local wholesaler. There is considerable buying of accessories taking place in Mansfield and Calion.

Notwithstanding the advantage of being able to stock lines of accessories, practically half of the retail buyers purchase their accessories within a 50-mile radius, as the summary shows:

7.1%	buy	locally	(in	their	home	town)	
8.3%	buy	at	an	average	of	10.2	miles
11.5%	"	"	"	"	"	29.0	"
22.4%	"	"	"	"	"	43.5	"
34%	"	"	"	"	"	62.5	"
6.4%	"	"	"	"	"	83.0	"
10.3%	"	"	"	"	"	204.0	"

There is a much greater division among wholesalers in the buying of accessories than in the purchasing of parts, and whereas 72 per cent of the retailers buy their replacement parts from one wholesaler each, only 35 per cent of these retailers buy their accessories from one wholesaler each. The explanation undoubtedly lies in the fact that the retailer will buy one brand of horn from a certain wholesaler, whereas he cannot get from that wholesaler the make of bumper or polish he may want and so goes to some other wholesaler. This divided buying is evidenced by the following:

34	retailers	buy	from	one	wholesaler	each
31	"	"	"	two	"	"
22	"	"	"	three	"	"
8	"	"	"	four or five	wholesalers	each

Such a wide scattering of buying would indicate buying from a great number of wholesalers and we find the 99 retailers purchasing their accessories from 57 different wholesalers. Here again there is very definite indication that these buyers are not only purchasing from the general wholesaler, but also from the automotive electric wholesaler who has entered extensively in the distribution of accessories in the last three or four years, but they are also buying from the replacement parts wholesaler who has been adding accessory lines in a limited way for a year or two.

The close lines of demarcation between different groups of wholesalers have faded out to a great extent in the last year or so, a fact supported by this study.

Another outlet for accessories which shows itself in this study is the number of motor car dealers purchasing certain lines of accessories through their distributors.

87 Per Cent Buy Tools

Nothing could be more significant in a study of the buying by car dealers, garages and repair shops than the fact that 98 of the 112, or 87 per cent, are buying shop equipment and the necessary tools for a repair business. Here is supporting evidence of the established fact that not only repair work, but overhauling and rebuilding are being done at the cross-roads and are being done on an efficient basis, perhaps not quite equal to that of the larger shops in the larger towns and cities.

This phase of the study is further supported by recent statements from shop equipment manufacturers who find the greater volume of their sales going today to the small town and the cross-road. Such should be expected as the shop equipment business has been worked intensively in the larger centers of population for several years and the larger movement to the cross-roads is just getting under way.

As to the channels through which this shop equipment is reaching the retailer, a few figures will suffice to lend some light.

First, the 98 retail buyers are making their pur-

Base of the Pyramid

THIS is a study among buyers who constitute the base of the automotive pyramid which is composed of the retailer, the wholesaler in the middle and the manufacturer at the apex. Too frequently efforts to analyze buying starts from the apex and travels toward the base, rather than beginning with the base and leading to the apex through the wholesaler to the manufacturer.

chases from 51 different wholesalers, which number embraces all types or classifications, with 40 per cent of the accounts in the hands of six of the large general automotive wholesalers located in the large distributing centers, such as Columbus, Dayton, Canton, Toledo, Cleveland and Chillicothe, which has generally been classified as a third-line city. There are 24 cities that constitute the purchasing centers so far as the seven counties are concerned. Here Columbus has the commanding lead with 47 accounts, Canton has 18, Dayton 13, Ft. Wayne 8, Chillicothe 9, Cuyahoga Falls 6, Cincinnati 5, Toledo 5, Chicago 5, Galion 5, Cleveland 4, Wheeling, W. Va. 4, Logan 3, Zanesville 3, Mansfield 3, and several other cities with 2 and 1 accounts.

The habit of buying near home in shop equipment parallels very closely the buying of accessories, as 50.4 per cent of the retailers buy within 50 miles of home. A further analysis gives the following:

5.3%	buy	locally	(in	their	home	town)	
7.6%	buy	at	an	average	of	11	miles
8.4%	"	"	"	"	"	28	"
28.3%	"	"	"	"	"	43	"
32.1%	"	"	"	"	"	67	"
7.6%	"	"	"	"	"	83	"
10.7%	"	"	"	"	"	205	"

One-half of the retailers concentrate their shop equipment and tool buying with one wholesaler, whereas the other half make purchases from two, three, four and in some cases five different concerns.

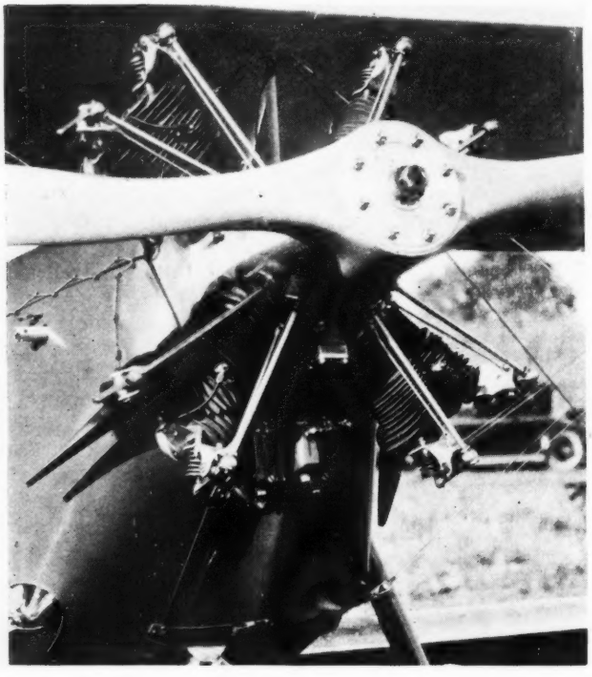
Performance of Fairchild Airplane Engine Improved

A NUMBER of changes recently made in the Fairchild-Caminez aircraft engine have resulted in decreased weight and greater reliability. These changes include a redesigned valve port, resulting in a lowering of the valve gear by ¾-in., redesigning of magneto brackets to set magnetos at 60 deg. instead of 90 so as to provide greater accessibility to magneto breaker points in airplane installations, and elimination of all plain type of bearings in the engine.

The piston and link assembly have been redesigned, resulting in a reduction in weight, and simplified production. Other minor changes include a rearrangement of cylinder studs to provide better accessibility, redesigning of propeller shaft splines to conform to U. S. Air Corps standard spline fittings, and changes in the starter engagement to provide engagement with either the dog clutch or spline clutch starter drive types.

While the engine will develop 150 hp. at 1100 r.p.m., rating of the engine has been set at 135 hp. at 1000 r.p.m. It has now passed its 50-hour type test and has showed excellent performance in airplane installations.

Comparing performance in a Waco "10" with a similar plane with an OX engine installation, there was a decrease in weight of 100 lb., 50 per cent higher available horsepower, reduction of take-off run by 50 per cent and from 10 to 15 m.p.h. higher top speed. The reduced propeller speed possible in this type design has also aided in increasing materially the overall efficiency of the powerplant.



Fairchild-Caminez production engine as installed on a Waco "10" plane

German Chemical Yearbook

IN connection with the Achema (Exhibition of Chemical Apparatus) which is being held bi-annually by the German Society of the Chemical Apparatus Industry simultaneously with the general meeting of the Union of German Chemists and other affiliated technical societies in Essen, Dr. Max Buchner of Hanover, has published an Achema Jahrbuch (Yearbook). The book is divided into four parts. The first part deals with general subjects touching the chemical industries. The second "scientific" part contains articles on the following subjects: Developments in Colorimetry and Spectroscopy; Resistance Vessels Without Platinum Electrodes; Ventilation in the Chemical Laboratory; Selection and Tests of Non-Corrosive Materials and Some New Acid-proof Alloys; the Problems of Metallurgy in Connection with Corrosion Research; Use of Aluminum in the Construction of Apparatuses; Development of Powdered Coal Firing for Steam plants; Chemistry and Water; Chemical Technology and the Science of Apparatuses; Types of Chemical Processes and their Apparatuses and On the Road to Further Possibilities. Next follows an "industrial" part containing technical descriptions of numerous new apparatuses and instruments for use in the chemical industries, while the fourth part consists of the advertising section. The show will have special sections devoted to apparatuses used in the coal industry, in thermal installations and in connection with water supply and drainage systems.

A TUBE protector of German invention has been brought to this country by Karl Hackert, 15 Park Row, New York. It consists of a pad made up of a considerable number of layers of closely woven fabric, which is inserted between the tube and the cover. It is claimed that the protector is impenetrable to nails and similar puncturing implements and makes the tire puncture-proof.

Just Among Ourselves

Willys Probably Right About Four-Wheel Brakes

JOHN N. WILLYS last January predicted that "every car with the probable exception of Ford will be equipped with four-wheel brakes inside of the next 18 months." Close study of events since that time and of the axle design of some current models would indicate that Mr. Willys' prediction has a fairly good chance of coming true; it has slightly over a year to run yet. If advance rumors are correct, moreover, Ford won't be the exception to the rule. As a matter of fact, Ford's action as regards four-wheel brakes may be a powerful factor in bringing about the consummation of the predicted event. If the new Ford doesn't have four-wheel brakes, Mr. Willys' prophecy has much less chance of being fulfilled than if the new Ford does carry such braking equipment.

* * *

Success Isn't Due to Knowledge Alone

WHY study engineering?" queries an engineer friend of ours, sending us an alumni employment bulletin of the employment bureau for the engineering schools of a large Eastern university. In the list of men available the salaries desired range between $40 and $60 a week for men between the ages of 30 and 35. Certainly the wages don't seem commensurate with the years of training and study which the men have gone through, but it is to be remembered that wages are paid, not on the basis of the cost of producing the wage earner, but on the basis of the value of that wage earner in producing marketable materials —tempered, of course, by the old law of supply and demand. We used to be more moved by figures of this kind than we are at present, having come to lean toward the idea that the trouble isn't so much that engineers or bootblacks or teachers or secretaries of Kiwanis Clubs are underpaid, as that some individuals have abilities and performance characteristics — as distinguished from knowledge alone—which make them more marketable products than others. In most office or professional jobs of modern industry, it seems to us, knowledge constitutes about 50 to 60 per cent of the requirements for commercial success. Without it, however, the other qualities usually are quite worthless.

* * *

We Had Lindbergh Using Too Much Oil

F. B. KILLIAN, chief, engineering division, automotive department, Vacuum Oil Co., rises to inform us that we made a bum calculation when we estimated the cost of fuel for Lindbergh's flight, inasmuch as we based the estimate on an oil consumption of 11.8 gallons. Mr. Killian cites facts and figures to prove that the oil consumption for the flight was 4.94 gallons or about 730 miles per gallon. In justice to the Wright engine and Gargoyle Mobiloil, Mr. Killian thinks, these facts should be made public. So do we—and they hereby are.

* * *

Can't Even Talk Speed in Washington!

BUT talking about speed, there is some logic but more silliness in the law recently passed by the State of Washington than in anything we've heard about for a long while. The law, as announced a week or two back, prohibits the advertising of any speed in excess of that permitted by the state laws. The logic appears in the idea of trying to keep advertisers from practically urging people to break the law. The silliness lies in the fact that speed laws in general are notoriously behind the times. There are, as everybody knows, hundreds of laws of all kinds on the statute books of every state which, if enforced to the letter, would practically demoralize the community as it now operates—and the speed limit laws are prominent among these. Laws usually lag far behind practice in most cases; where they attempt to go far in advance of common practice, they usually become a dead letter if they are of a restrictive character; witness the blue laws of many states and the Volstead Act in many areas of the country. To attempt strict enforcement of laws which common consent and common practice have made a dead letter means simply to call attention to their deadness. If the 12 m.p.h. speed limits of many small towns along main highways were literally and actively enforced, those towns would find their streets so choked with traffic that their citizens wouldn't be able to cross the streets for hours at a time.

* * *

Might Feature Ease of Handling in Traffic

IF the Washington law mentioned be actually enforced, the manufacturers might be able to make a virtue of a necessity by using copy emphasizing the easy, efficient operation of their cars under traffic conditions, where much low speed work is necessary. Then again, we wonder how the law would treat copy which claimed a car to be "as swift as the wind." Some winds are within the legal speed limit, *n'est ce pas?*

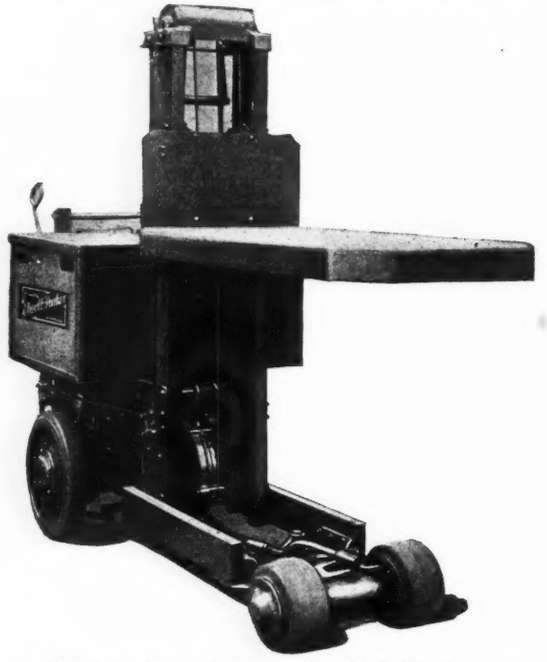
—N. G. S.

NEW DEVELOPMENTS—Automotive

2-Ton Lift Truck

THE Elwell-Parker Electric Co., Cleveland, has announced a new lift truck of 2-ton capacity which is capable of elevating its load from 4 to 8 ft. above the floor.

The new machine is of all-steel construction. The power unit consists of an inclosed Elwell-Parker motor,



Elwell-Parker, 2-ton capacity high lift tractor

steel brake drum, steel multi-thread Brown & Sharpe worm to bronze differential cage, chrome vanadium drive shafts and universal joints to permit steering and the delivery of power to the steel clutch plates bolted to the outside of the drive wheels which are fitted with solid rubber tires and Timken tapered bearings. The third point support for the unit powerplant is a ball beneath the drive motor.

Operating pedals are fitted with a heel rest and have a non-slip surface. Braking and power application are separate to permit operation on inclines. In the heavy drum type controller all fingers have reversible tips and the controller contacts are automatically lubricated.

The lift controller is also of drum type and is located below the drive motor. An automatic trip device limits the height of the platform. The platform is plate steel with heavy angles welded down the middle for attachment of steel support arms. Each arm carries two rollers which bear on channel uprights fitted with track. Lifting is done with motor and spur gear reduction to grooved drums carrying steel cable which runs over sheaves at the top of the uprights. Alemite lubrication is provided.

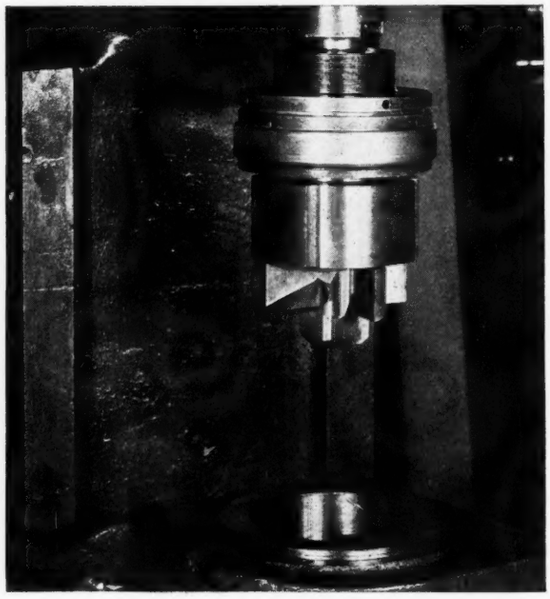
Governor and Speedometer Driver

A COMBINED speed governor and speedometer driver has been patented in England by the firm of Morris Commercial Cars, Ltd., of Soho, Birmingham. The drive is taken from the tailshaft of the transmission, from which a flexible shaft extends to the governor, located on the side of the engine directly over the carburetor. From the opposite end of the governor spindle a flexible shaft extends to the speedometer on the instrument board.

Multi-Diameter Tool

ONE of the difficulties often experienced in machining parts which have to be surfaced and bored, and possibly counterbored, is to keep the counterbore and bore square with the milled surface. The recent introduction of the Eclipse multi-diameter tool, manufactured by the Eclipse Counterbore Co. of Detroit, has made it possible to render machining of such parts foolproof by incorporating in a single tool, cutters for the several operations. Aside from reducing the number of operations, the tool enables working to closer limits. Continental Motors Corp. has adopted this tool for a number of machining operations. The accompanying illustration shows one of the tools being used to finish machine a thermostat housing in a single operation. Formerly three different operations were required, milling, boring and counterboring. According to Continental, this tool has enabled them to perform the new operation and keep sizes and eccentricities of the hole diameter, counterbore diameter, counterbore depth, and the contact surface in relation to these to within 0.001 in. Moreover an actual saving in machining cost of 10 cents per motor has resulted, while it has been found possible to turn this operation over to an inexperienced operator.

As will be noted from the illustration, the tool does not have to be scrapped when worn down, but each set of cutters can be reground on a simple grinder, this having been made possible by allowing sufficient clearance between the cutting blades.

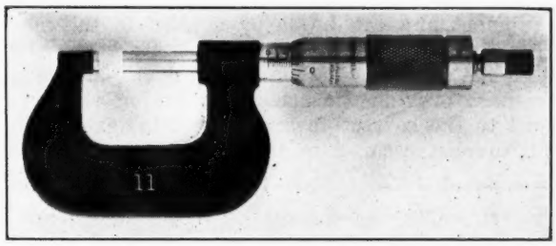


This operation with the Eclipse multi-diameter tool, performed by Continental on its engine thermostat housings, faces the top, bores and counterbores simultaneously

Parts, Accessories and Production Tools

Brown & Sharpe Micrometer

BROWN & SHARPE MFG. CO., Providence, R. I., has placed on the market a new micrometer, No. 11, which features an adjustment for wear and a frame so shaped that measurements of many odd-shaped pieces are possible with it.



Brown & Sharpe micrometer

Adjustments for wear of its measuring surfaces can be made quickly and the adjustment, when made, is locked. The frame opening is enlarged to take various odd-shaped pieces and its small size at the anvil end adapts the instrument for measuring in narrow slots.

Supercharger for Chevrolets

A NEW type "BAT" supercharger is now in production and is available at present for Chevrolet models from 1924 to 1927, according to the P. J. F. Batenburg Co. of Racine, Wis. Other models will follow shortly. The supercharger consists of a special design intake manifold, including in the vertical lead from the carburetor a fuel and air mixing device known as the Bat Dual Rotary Hydrocarbon Mixer. This device consists of a double conical series of vanes, with tips meeting in the center. The fuel mixture from the carburetor coming into this section of the intake manifold has to pass through these vanes toward the outside of the manifold and then return through the vanes of the upper cone into the center section of the manifold from whence it passes on into the cylinders in the normal way. This reversing of the air-fuel flow in the manifold establishes a high turbulence, since the vanes are so arranged as to give the mixture a rotary as well as radial movement.

As a result it is claimed that much better vaporization of fuel is obtained. The Bat supercharger differs from the normal or blower type supercharger in that it makes no attempt to increase volumetric efficiency by putting pressure back of the charge.

Collapsible Rim

GEORGE D. CURTIS, Chicago, has invented a three-piece collapsible rim which is said to require but five seconds for removal of casing and 10 seconds for putting in casing, with elimination of all danger of pinching the tube. At one of three joints in the rim is a latch which, when pressed down into place, is quickly locked and holds the rim rigidly in position.

When the latch is unlocked and lifted up the pressure of the tire causes the section of the rim adjoining that upon which the latch is hinged to move inward, thus drawing it away from the rim and freeing the latter from all contact with the casing. As the latch is moved back it covers the valve to protect it from injury.

For replacing the rim the sections are drawn snugly up against the casing by hand pressure and then the latch is pushed into position and acts as a lever to close the rim with a minimum of effort.

Multiple Spindle Drilling Machine

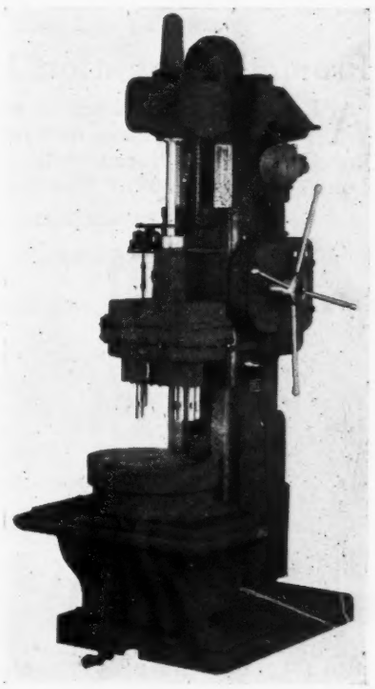
MANY shops have jobs suitable for drilling on single purpose multiple spindle machines, although production is not large enough on any individual job to warrant the purchase of a special machine for it. Other shops have frequent changes in design on a job which production is high and do not care to purchase a complete machine each time a change is made.

To meet these conditions, the Footburt No. 15½-F multiple spindle drilling machine has been equipped with a flanged sliding unit to which multiple heads may be bolted. To change from one job to another, it is only necessary to change heads, which does not take long. Two dowels in hardened steel bushings are used to locate the heads accurately on the slide.

This type machine is said to be more accurate than either a universal joint machine or high duty drilling machine with a multiple spindle head, especially when a large multiple head is used. With the exception of the flanged type slide, the machine is of the same design as the regular Footburt No. 15½-F drilling machine and may be arranged for either motor or belt drive.

The drive is simple. An oil level is carried in the upper drive housing and all bearings are lubricated by the splash system. The head is lubricated by a small oil pump mounted on it. The machine shown in the illustration is arranged with a head having two groups of spindles, this being one of many head constructions that are possible with this machine.

The circular table illustrated is of the three position indexing type, indexing at 120 deg. Three fixtures are mounted on this table. The front station is used for loading, the next for drilling part of the holes and the third for drilling the remainder. In this particular case very close centers required an arrangement of this kind. Other ar-



Footburt Multiple Spindle Drilling Machine

rangements are possible, such as using the front station for loading, the next station for drilling and the third for reading or counter boring.

It is also possible to furnish a two-position table so that one or more pieces may be loading while the machine is in operation, thus saving the loading time. The indexing table is operated by the pedal at the front of the machine. A downward pressure on the pedal withdraws the locating plunger from the pilot bushing in the table and at the same time the table is elevated 1/16-in. on a ball bearing. The entire weight of the table is carried on this ball bearing, relieving the outside bearing surface and making it easy to index the table regardless of size.

This machine may be furnished with either a stationary box table as illustrated, or with a vertical adjustable table.

Elastic Stop Safety Nut

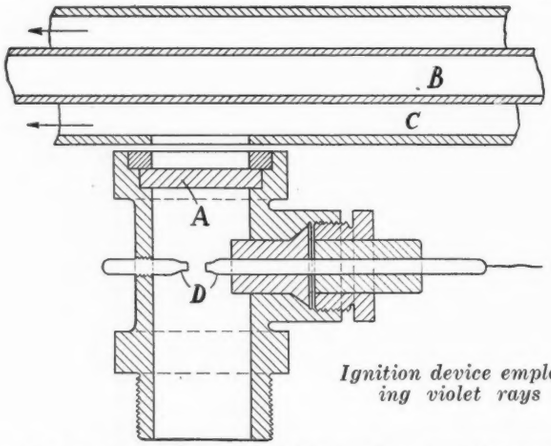
THE Elastic Stop safety nut is a new product of the American Gas Accumulator Co., Elizabeth, N. J., and combines the properties of a lock nut and a regular nut within a single piece.

Extending about a third of the way through the nut is a cushion or disk of hard vulcanized fiber securely riveted within the nut. The hole through this disk is not threaded and is slightly smaller than the outside diameter of the bolt. When the bolt enters the hole it meets resistance from this elastic cushion so that the bolt is pressed backward and contact between the bolt and the nut takes place on those surfaces which sustain the pressure after the nut is drawn home against a support.

In addition to this metallic friction which eliminates play between the bolt and nut, as the bolt enters the nut further it impresses a thread in the fiber cushion which fits with a suction fit around the bolt. The sum of these two conditions lock the nut securely while in place and the fiber is of such material that the nut can be screwed off and on many times without impair ing its locking effectiveness.

Promoting Ignition by Violet Rays

A RATHER novel idea is embodied in a British patent on the "use of Violet Rays for Supporting Combustion" recently issued to H. A. Gill, of London (No. 269,808). The inventor employs a modified form of spark plug which is closed at the top by a quartz window A. Above this window there is a violet ray apparatus B which incidentally produces ozone in the surrounding tube C. This ozone is led to the carburetor. The rays, penetrating the quartz window, ionize the space between the spark points D, D, and it is claimed that as a result the points may be spaced as far apart as ⅛ in. without calling for an abnormal voltage. The scheme is claimed to increase the rate of combustion of the charge.

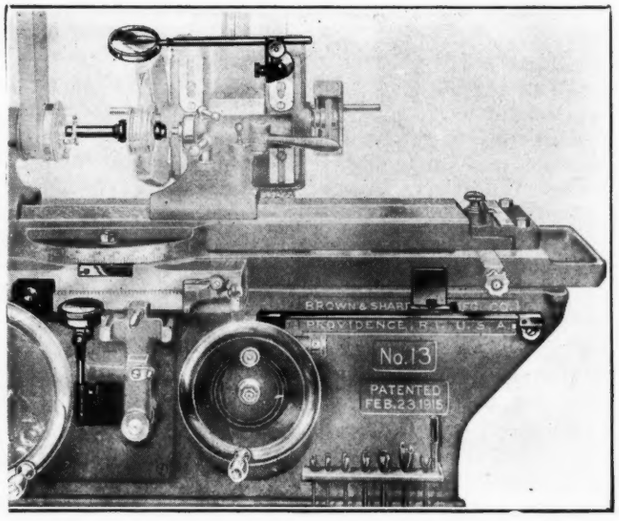


Ignition device employing violet rays

Tool Grinding Equipment

BROWN & SHARPE MFG. CO., Providence, R. I., has developed equipment for use on its No. 13 Universal and tool grinding machine for grinding the contours of screw machine forming tools. This equipment is known as the Circular Forming Tool Grinding Equipment and can be easily applied to the machine.

Floating work arbors hold the work in position between centers and a radius truing device and magnifying glass provide for accurately truing the grinding wheel to the correct form. A dial indicator mounted in a bracket secured to the bed permits an accurate reading of the table movement as the point on the indicator engages with a stop secured to the sliding table dog rack.



Brown & Sharpe forming tool grinding equipment as installed on a No. 13 universal and tool grinding machine

A scale to the right of the cross feed handwheel is designed to give an accurate vernier reading on long work beyond the capacity of the dial. The vernier is secured to the sliding table. Fine angular adjustments of the uprights are facilitated by a vernier located on the cross feed carriage at the rear of the machine. When grinding angles the swivel table vernier provides for additional adjustments.

Wheel and Axle Aligner

THE Bear Manufacturing Co., Rock Island, Ill., has developed a new type wheel and axle aligner and gage which, by means of a gear on the indicating arm, amplifies the readings. Four separate dials are mounted on a revolving plate so that reading may be taken on 30, 32, 34 and 36-in. wheels.

The new device is so made that it telescopes when compressed and is held in position between the wheels by a compression spring and can be left in position while adjustments are being made. It is furnished with a template made from heavy sheet steel in which the ends are perfectly square and held in place by welded corners.

New Type *of* Aluminum Body Built for *All-Aluminum* Chassis

No wood used in construction. Design incorporates number of distinctive features. Development is made possible by new alloys and modern welding practice.

A NEW type of body has been designed and built by John S. Burdick for the Aluminum Company of America, Buffalo, N. Y., and has been mounted on a Pomeroy all-aluminum six-cylinder chassis.

This body is made entirely of aluminum. Although bodies made of cast aluminum were produced in the past, the material then used had many limitations as compared with the best now available. These earlier bodies were made in sections that were bolted together, and the joints formed were either covered by applied moldings or finished out in the so-called coach type. A number of wood parts, such as sills and frames for trim, were also included in this earlier construction.

Alloys recently developed in the foundries of the Aluminum Co. of America make it possible to produce castings of complicated design, of large surface area and very thin sections, and this, together with modern welding practice, has made possible the production of a body which when completed is one solid part, with surfaces which can be given an excellent finish.

The aim has been to produce a body of conservative design, yet incorporating a number of new and distinctive features. The treatment of the molding is rather a departure from regular practice. The moldings used are narrow and high (½ in. base and ½ in. in height), and of parabolic section. The belt is a single line molding of this section which is tapered from its original size at the door front to approximately the size of a lead pencil at the radiator. The drip molding is made of this same section, except that it is grooved out in the bottom and is tapered from the front of the door around the corners of the visor.

The molding around the front and back to the rear quarter is continuous, and the rear ends are tapered. In order to balance the effect of the molding treatment there has been included a fine molding of 3/16 in. base, parabolical section which is intended for relief effect and to permit of variation in paint combinations.

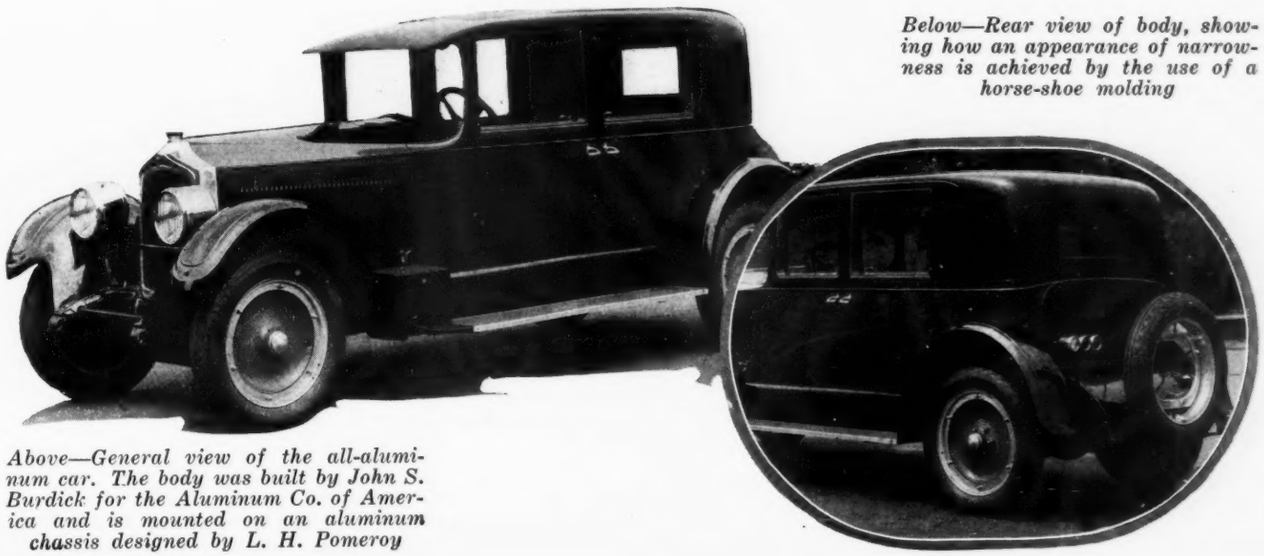
The back of the body is unique in that although it is very wide and low, it has an appearance of narrowness when viewed from the rear. This is accomplished by the use of the so-called horseshoe molding lines. In addition to this the lower body quarters have been cut out to give a concave effect, thus eliminating the fullness that goes with the full round corners.

Increased Vision

A one-piece stationary windshield has been designed to afford increased vision, the coupe pillars being of no greater width from the driver's point of view than the distance between the eyes, while from a side view these pillars appear to be of substantial size.

The doors are cast in one unit. The garnish moldings are made of aluminum in one piece and applied without screws in the visible surfaces; they are extended on the bottom in a way to form a frame for the broadlace which is used across the door at the belt.

The hinges are of a special design made from a cast aluminum alloy. The general structure of this body, including sides, back, cowl, doors, sills and roof quar-



Above—General view of the all-aluminum car. The body was built by John S. Burdick for the Aluminum Co. of America and is mounted on an aluminum chassis designed by L. H. Pomeroy

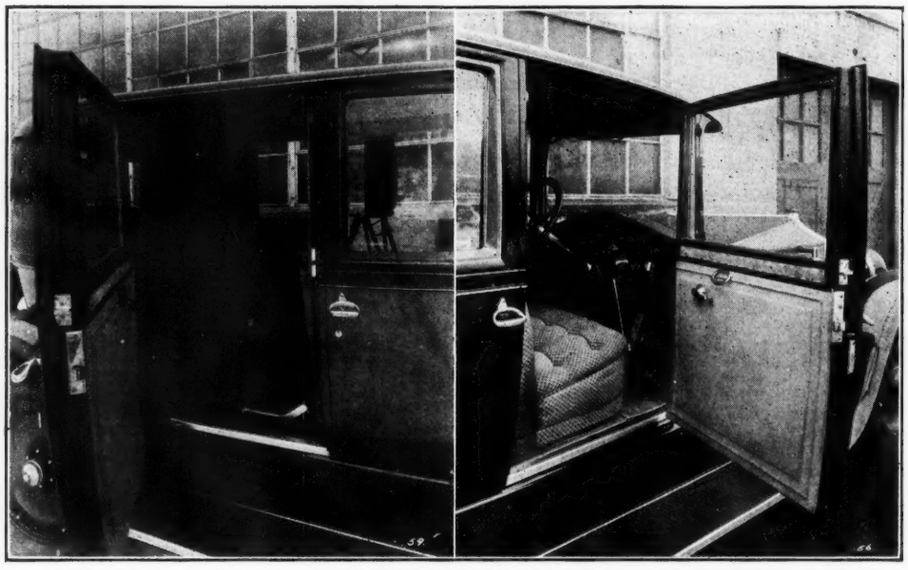
Below—Rear view of body, showing how an appearance of narrowness is achieved by the use of a horse-shoe molding

ters, consists exclusively of cast sections. No wood whatever is used in the structural design of the body, the seats, lining and trimming strips being made from sheet aluminum.

The design of the interior trimming is carried out along usual lines, with the exception of the screwless garnish moldings and the paneled broadlace.

In producing the first few bodies of this type no attempt was made to accomplish lightness, the finished body being approximately the same weight as the standard composite wood frame aluminum paneled bodies.

Road tests which have totaled 50,000 miles to this date have shown very gratifying results. Further development of the all-aluminum cast body and of bodies produced entirely from aluminum alloy sheet for both passenger cars and buses is being carried on.



Views showing interior of the all-aluminum car. Note neat appearance of doors and grouping of instruments in the front compartment on the right

More Americans Than Ever Before Taking Cars Abroad

As evidence of the competition that motor touring areas and resorts in the United States are up against, reports for this season to date indicate an increase of close to 100 per cent in the number of Americans taking their cars abroad.

An announcement to this effect was issued by the National Headquarters of the American Automobile Association, and is based on data compiled by the Foreign Department which was created to take care of the interests of A. A. A. motorists traveling in foreign countries.

Reports From European Clubs

"That the United States is contributing heavily this year to the international motor touring caravan is quite apparent from preliminary reports reaching us as the American member of the International Touring Alliance," the statement declared. "Practically all of the 35 European touring clubs constituting the 'Alliance' and with which we have reciprocal relations, have noted a big increase in the number of American cars on the highways of the Old World."

The Foreign Department of the A.A.A. has made an analysis of the facts in the situation and cites the following reasons, among others, for the big increase in American motorists who are traveling under their own power in Europe this season.

"First, the International Touring Alliance has facilitated the circulation of foreign cars abroad and simplified customs requirements and the business of securing triptyques for accredited American motorists.

"Second, several of the large steamship companies have made special provisions for transporting cars uncrated as baggage and at reasonable prices, including insurance costs.

"Third, European resort and touring areas, in many instances supported by local governments, have been conducting a world-wide advertising campaign, but particularly directed at United States prospects, and the fruits of which campaign are now manifesting themselves.

"Fourth, Americans have found that the most pleasurable way of seeing Europe is by motor and the American motorist likes to travel under his own power, provided he can secure motoring service, which is becoming more and more available through the activities of the clubs comprising the International Touring Alliance."

The Foreign Department of the A.A.A. will take charge of a club member's car anywhere in the United States, transport it abroad and arrange all customs formalities. Temporary entry of automobiles into various European territories has been standardized for most countries by the Alliance Internationale de Tourisme, under whose aegis a document known as the Carnet de Passages en Douanes is issued. This covers Great Britain, the Irish Free State, France, Italy, Belgium, Switzerland, Holland, Germany, Austria, Norway, Denmark and Sweden. As an alternative to the "Carnet," there is another form of pass-sheet, the triptyque, one triptyque being required for each of the above-mentioned countries. There are, besides, triptyques for Czechoslovakia, Egypt, Finland, Hungary, Poland, Portugal, Rumania, South Africa, Spain and Yugoslavia. The American holder of a Carnet or of triptyques passes the customs without being called upon to deposit the dues at the frontier. All he need do is to lodge security with the A.A.A.

One Registration Number Needed

By mutual agreement, over thirty-five nations are parties to a convention which enables the motorist to travel in all territories embraced by the group on one registration number for the particular automobile involved and dispense with separate driving licenses. This arrangement solves the circulation problem and is controlled by a document termed the International Traveling Pass, or Certificat International de Route.

American *Motor* Vehicles Far Ahead *in* S. African *Registrations*

86 per cent of new passenger cars placed in service in 1926 bought in United States. Great majority of trucks and buses are also of American makes.

SOME interesting information in regard to motor vehicle registrations in the Union of South Africa has recently been published by the Office of Census and Statistics of the Union. Of greatest interest are tables of motor vehicle registration by makes during 1926.

In the accompanying tables are shown the various makes of passenger cars, trucks and buses which are in service in the Union, the makes being arranged in order of their relative numbers in use.

Of the total of 78,120 passenger cars registered during 1926, over 67,000 or 86 per cent are of American make (this is assuming that none of the cars listed in the miscellaneous group are of American make.) There are only three foreign cars, Fiat, Austin and Morris, which have been sold in sufficient quantities in South Africa to warrant keeping separate records of their registrations, while there are 15 American makes which have been sold in quantities over 1000.

The truck situation is much the same. Of the 5436 trucks registered last year, 4480 or 83 per cent (again without consideration of the American trucks which are probably included in the miscellaneous group) are of American make. There have been seven makes of foreign trucks of which more than 20 have been sold so that their registrations are segregated, the total of these seven makes being 344. There are only 11 American trucks in this category but the total number of them in use last year was 4480.

Passenger Cars Registered in Union of South Africa During 1926

Ford	18,795	Fiat	1,231
Dodge	9,387	Rugby (Star)	1,150
Chevrolet	8,208	Hudson	1,143
Buick	5,127	Nash-Ajax	1,096
Overland	5,063	Austin	1,061
Hupmobile	3,658	Morris	938
Studebaker	3,210	Durant	917
Essex	2,243	Willys-Knight	633
Maxwell	1,960	Misc.	7,665
Chrysler	1,932		
Oldsmobile	1,421	Total	78,120
Oakland	1,282		

Buses Registered in Union of South Africa During 1926

Reo	102	Leyland	19
Ford	97	Misc.	350
Graham Bros.	60		
Federal Knight	28	Total	656

Trucks Registered in Union of South Africa During 1926

Ford	2,680	Leyland	53
Chevrolet	418	Clydesdale	51
Dodge	412	Federal Knight	39
Reo	407	Karrier	26
Graham	220	Berliet	25
Overland	105	White	23
Republic	82	G. M. C.	21
International	73	Misc.	612
Thornycroft	71		
Morris	64	Total	5,436
Guy	54		

The bus market has been spread out quite a bit among many makers, apparently, with only five makes having 20 or more in use. Of these five, however, four are of American make and they include a total of 285 buses or some 43 per cent of the whole number in use in the Union.

These figures are of interest because they indicate that while competition from other countries, and particularly Great Britain, may have increased greatly during recent years in South Africa, the net results of these efforts, so far at least, have not been very detrimental to American sales.

In spite of preferential tariffs which seriously affect the efforts of American manufacturers to sell vehicles in the Union and in the face of a rather strong campaign of propaganda directed toward influencing British subjects to buy British-made goods, American-designed and built vehicles have continued to hold their place in this market. In the face of the difficulties which confront our manufacturers this record speaks very highly for the suitability of our products for use in South Africa and for the excellent value which they give to purchasers.

OUT of 1732 tractors registered in Hungary at the end of 1925, nearly 1200 were of the motor driven type, indicating a general adoption of the motor tractor in place of the steam-driven vehicle. Before the war the number was negligible.

Cozette Builds *Vertical Four-Cylinder* Two-Stroke Engine

Has bore and stroke of 2.2 in. and output is around 100 hp. Two crankshafts connected by spur pinions. Piston and cylinders aluminum. Designed for racing.

By W. F. Bradley

DOUBLE-PISTON, two-crankshaft, two-stroke supercharged engines have attracted the attention of several European automobile concerns. Fiat is reported to have carried out very careful experiments in this direction but its engines have never been shown to the public.

Engineer Causan last year built a four-cylinder, horizontal two-crankshaft engine and raced it in a French motor boat. These experiments do not appear to have been continued.

Now the Cozette Carburetor Co. of Paris has built a vertical four-cylinder engine of the same general type and on the completion of the bench tests now proceeding, intends to put the engine into a racing chassis.

The Cozette engine has a bore and stroke of 56 by 56 mm. (2.2 in.), thus bringing it within the 1100 cc. piston displacement limit. The cylinders are an aluminum casting carrying cast-iron liners put in from each end, but not joining up, so that the combustion chamber is entirely aluminum. The cylinders are bolted on the lower crankcase, which forms an oil reservoir, as in the normal type of engine, and the two crankshafts are on the top and the bottom of the cylinder blocks.

The three intermediate crankshaft bearings are plain, while ball bearings are used for the two extremities. The two crankshafts are connected by spur pinions, the intermediate pinion being on ball bearings and being twice the diameter of those on the crankshafts. A very light flywheel is fitted.

Aluminum alloy, long-skirt pistons are used, together with tubular section connecting rods having split ends and roller bearings. Pistons are of the dome-head type without deflectors, for the mixture is admitted and the gases expelled through ports in the cylinder walls.

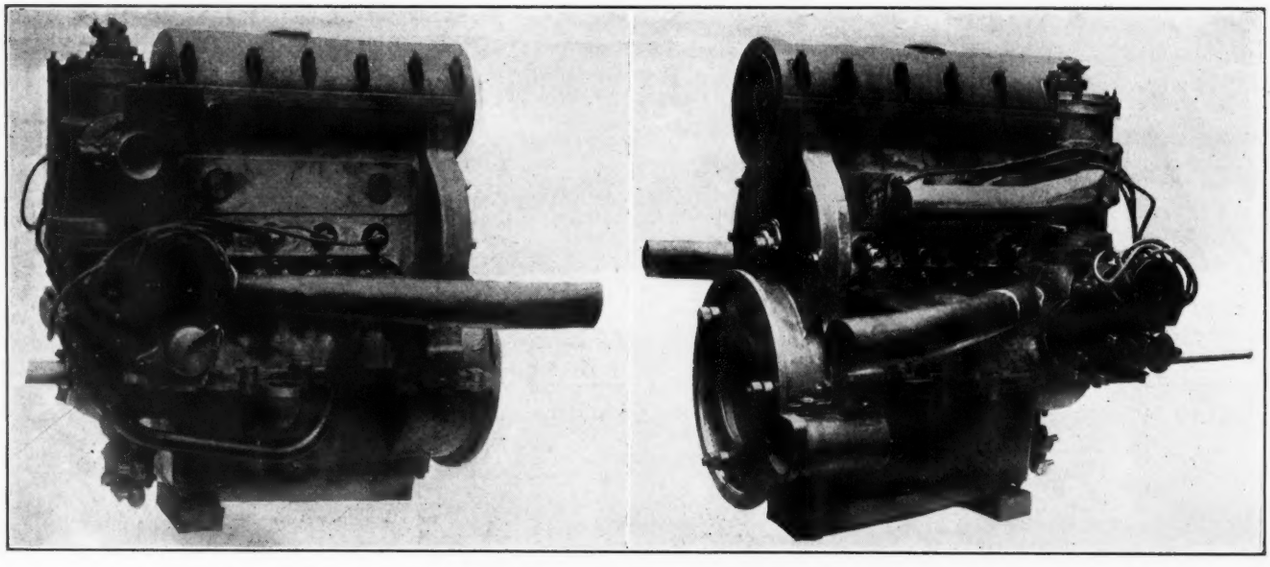
The lower, or exhaust, crankshaft has a slight lead over the upper or intake crankshaft, so as to get rid of the greater portion of the gases before the fresh mixture is admitted. Exhausts are on both sides of the cylinder, while the intake ports are one side only.

The mixture is delivered from a Cozette carburetor and a vertical axis vane-type Cozette compressor driven off the intake camshaft.

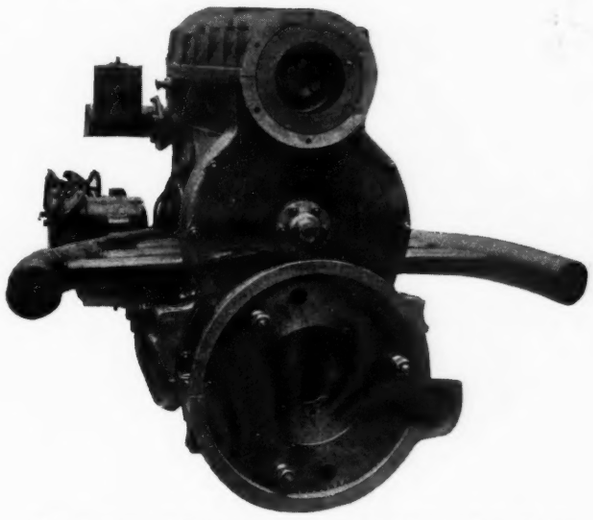
Two magnetos are driven off a transverse shaft in front of the engine, immediately under the compressor, and deliver current to two sets of plugs placed horizontally on opposite sides of the cylinder. The water pump is driven off the magneto shaft and circulates water completely around the cylinder barrels.

Lubrication is under pressure throughout, with the oil return from the upper crankshaft to the sump through the rear housing containing the gears connecting the two crankshafts.

Being all aluminum and steel construction, it is



Left—Cozette opposed-piston, two-crankshaft, two-stroke supercharged engine. Right—View of intake side



Rear view of Cozette engine, showing exhausts on opposite sides

claimed that the weight of the engine is practically the same as that of a normal four-stroke of equivalent size and corresponding construction. The power output obtained is in the neighborhood of 100.

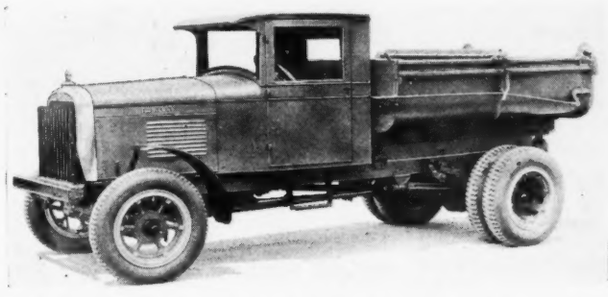
One of the greatest difficulties in the production of an engine of this type is in the pistons, which have to operate without the advantage of a water-cooled head. The present experimental work relates to a type of piston which will radiate the intense heat of a two-stroke supercharged engine and rings which will prevent the flame passing.

New Indiana Truck Model

INDIANA TRUCK CORP., Marion, Ind., has announced Model 615-A Road Builder, a six-cylinder truck equipped with a dump body capable of holding two, six or seven-bag batches of concrete mix. Complete weight of the truck with body and hoist is 6900 lb.; wheelbase is 136 in.; loading space is 74 ft. 4 in., and turning radius is 24 ft.

The engine has a bore and stroke of 3⅜ by 5 in., and is of the valve-in-head type cast in block with the crankcase. Full force feed lubrication is provided. Water circulation is by a centrifugal pump. The carburetor is of the plain tube type, 1¼ in. diameter, fitted with a hot spot. High tension magneto ignition is employed.

The clutch is of the dry plate type; the transmission is four-speed selective mounted in unit with the engine. The tubular propeller shaft has metal universal joints at each end. Rear axle is semi-floating, spiral bevel gear drive. Double internal brakes are used on the rear wheels.



Indiana Model 615-A six-cylinder, two-batch road builder

The front axle is of I-beam section with nickel steel spindles. Cam and lever steering gear operates through an 18-in. wheel. The frame is of pressed steel, 6⅛ in. deep, ¼-in. thick with 3¼-in. flange. Springs are of silica manganese steel. There are eight leaves, 40 in. long and 2½ in. wide at front and 15 leaves, 50 by 3 in., rear. Metal spoke wheels are fitted, dual rear.

Equipment includes Moto Meter, front fenders, bumper, metal radiator guard, air cleaner and oil pressure gage. Body is 66 in. wide, 90 in. long and 17½ in. high. Loaded height of top of body is 61 in. The hydraulic underbody hoist provides a 55-deg. dumping angle.

Wholesale Distribution

SALES and advertising executives will find a wealth of valuable information in "Wholesale Automotive Distribution," a handsomely bound 48-page book just issued by the Chilton Class Journal Co. It was compiled as a result of a complete territorial analysis by a group of the industry's leading manufacturers who successfully distribute through jobber channels.

A general thesis, occupying the first seven pages of text, followed by a scientific breaking down of the general territory into first, second and third line points of distribution, gives an accurate picture of the machinery of automotive wholesaling.

Complete data, including number of car agencies and service stations in each of the cities and towns listed and population, is presented.

The cities designated as distribution points are divided into three classes of relative importance for purposes of differentiation. For example, if 60 per cent of the group of manufacturers utilize a specific city for wholesale distribution, it becomes a first line point. If 40 per cent utilize a city it becomes a second line point, and if utilized by less, it drops into the third line classification. The first line cities are those in which automotive distribution started and in which it flourished for a period of from 10 to 25 years. In these cities are wholesalers with large organizations, and it is to these cities that automotive manufacturers first came in quest of territorial distribution. As the business developed, second line points of distribution automatically came into existence. Today the first and second line points are of equal importance to any manufacturer seeking national distribution. The third line points represent the next stage of the process of national wholesale distribution evolution.

Worm Drive Autocar Truck

A NEW model A truck of 2-ton capacity is being manufactured by the Autocar Co., Ardmore, Pa. The new chassis embodies a worm drive, full-floating rear axle and auxiliary rear springs. Other units, including four-cylinder, 4 by 5½-in. engine, electric lights and starter and Bendix four-wheel brakes are identical with corresponding parts in the 1½-ton Model A truck.

The worm is located below the gear in the rear axle and power is transmitted through a drive shaft of two sections with an intermediate bearing and three metal universal joints. The auxiliary springs are semi-elliptics with four leaves mounted above the main springs and engaging with L-shaped brackets on the frame side members under load.

Either pneumatic or solid tires are fitted, the former being 32 x 6 in. front and 34 x 7 in. rear and the solids being 34 x 4 in. front and 34 x 7 in. on the rear. Two wheelbase lengths, 142 in. and 166 in., are offered.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Saturday, July 30, 1927

Large Fall Sales Market Seen Starting in August

PHILADELPHIA, July 30—With generally sound conditions prevailing in most sections of the country, the automotive industry is looking for the Fall months to bring a period of large sales volume. Gradual improvement in sales is expected beginning early in August, with the real big business to follow the announcement of the new Ford cars.

It is generally conceded that the Ford company will develop a very large market, at least for a time following its new model showing, but other companies expect to come into much larger business with the Ford boom. To a considerable extent, the delay in announcing the Ford car is holding back orders on other cars, even in classes considerably removed from that occupied by Ford.

Production in the first six months of the year ran 276,733 under the first half of 1926, all months of the first half being under corresponding months last year, with sharp drops in January, February and June. The first two months suffered from a carry-over of the late 1926 output, with June totals reduced by the almost complete suspension of Ford. The total reduction in output, however, represented considerably less than one month's shipments and can easily be overcome with good business in the later year.

Dealer stocks of new cars are favorable for a quick upturn in factory shipments when the retail Fall demand begins, and used car stocks are showing steady reduction in the face of good touring weather.

Bendix Brake Acquires Coatalen Servo Brake

CHICAGO, July 25—The Bendix Brake Co. has recently secured the patent rights throughout the world on the self-contained servo brake, designed by Louis Coatalen for the Sunbeam-Talbot-Darracq interests. All manufacturing rights on the self-contained servo brake were acquired by the Bendix company covering the pioneer work of M. Eugene Renaux of Paris, designer of the first brake of this type, as part of a broad experimental and development program, including a very intensive investigation of servo action.

Reeves and Bauer Return

NEW YORK, July 29—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, returned from Europe today, and George F. Bauer, secretary of the foreign trade committee of the chamber, returned from South America.

Sales Tax on Cars Proposed in Georgia

ATLANTA, July 28—Two bills of vital importance to the automotive industry in Georgia were introduced the latter part of July before the Georgia State Legislature, now holding its regular biennial session in Atlanta, both of which are being vigorously opposed by the legislative committee of the Atlanta Automobile Association.

One of these bills is a general sales tax measure which proposes to put a 1 per cent tax levy on the retail selling prices of a number of items. Although it omits mention of several lines it does not overlook the automotive business, for it lists tires, accessories, automobiles and lubricating oils, to say nothing of motorcycles and bicycles. It is estimated that if passed the bill would add between $2,000,000 and $2,500,000 per year to the revenue of the state, of which a goodly share would be contributed by the automobile industry.

The other bill introduced is similar to one that came up before the legislative session in 1925, and would require manufacturers of automobile tires and tubes to stamp the date of manufacture on all tires and tubes sold in the State of Georgia, a measure that would work a considerable hardship on the industry should it become a law.

Blackhawk Company Buys Hydraulic Tool Company

MILWAUKEE, July 30—Blackhawk Mfg. Co. has purchased the Hydraulic Tool Co. of Los Angeles and will market the hydraulic oil-power jacks made by this company through the Blackhawk sales organization. Manufacture of the line will be moved to the plant here where it will be made with the present Blackhawk products.

Up to the purchase by Blackhawk, the hydraulic jacks have been made and distributed on the Pacific Coast over the past five years. It is planned to extend this distribution to a nation-wide basis immediately.

Increased Car Sales in Midwest Predicted

MILWAUKEE, July 25—An increase of from 20 to 25 per cent in shipments of passenger cars during the third quarter of 1927, as compared with the previous year, was predicted in the forecast of commodity shipments of the midwest territory at the regional meeting held at Green Bay, Wis. According to E. A. Lalk, general agent of the Milwaukee Road freight department, with headquarters at Milwaukee, one reason for the predicted increase is that while the peak of automobile buying usually has been reached in June, this year it was fully a month late. The belated summer and hesitancy in business progress generally were given as the main reasons.

Farm Implement Exports Show $6,000,000 Decline

WASHINGTON, July 27—Exports of agricultural implements from the United States during the first half of this year totaled $42,247,558, a decline of $6,000,000 from the total exports of the first half of 1926, according to figures announced by the U. S. Department of Commerce. Shipments during June, 1927, showed an increase over May and also over June, 1926. The total was $7,856,524, as compared with $6,111,381 in June, 1926, or approximately 22 per cent.

A total of 5273 wheel tractors was exported during the month, which was almost double the number shipped in June, 1926. This accounted chiefly for the increase, as there was little change in other items, the department announces.

Bosch Seeks Plant Sale

SPRINGFIELD, MASS., July 28—Negotiations by the American Bosch Magneto Corp. to sell the old Gray & Davis factory building in Cambridge to the Jordan, Marsh Co., Boston department store concern, are making good headway, according to Arthur T. Murray, president of Bosch. Mr. Murray declined to state the price that the company will receive for the property, but admitted that a decided financial advantage would accrue to Bosch from the release of capital for active use.

G.M.C. Earnings Increase $27,550,253

Net of $129,250,207 is Largest for Any Half in Corporation's History

NEW YORK, July 28—Net earnings of General Motors Corp. applicable to dividends, including equities in undivided profits of subsidiary corporations not consolidated, totaled $129,250,207 in the first half of 1927. This is an increase of $27,550,253 over the first half of 1926 after making allowance for earnings accruing to minority interests in Fisher Body Corp. at that time outstanding.

After dividend deductions for preferred and debenture stocks of $4,408,220, the first six months' earnings are equivalent to $14.35 a share on 8,700,000 of common stock outstanding, and compares with $11.56 a share for the first half of 1926, making allowance for the increased number of shares resulting from the stock dividends paid Sept. 11, 1926.

In presenting the report, A. P. Sloan, Jr., president, said:

"General Motors sales of cars to dealers, dealers' sales of cars to users, as well as earnings of the corporation in the first six months of 1927, exceeded any six months in its history. Likewise sales of cars to dealers, sales of cars to users and earnings for the second quarter of 1927 exceeded any quarter since the company was organized."

Du Pont Net $21,436,642, Buys U.S. Steel Common

WILMINGTON, July 28—The semi-annual statement of E. I. du Pont de Nemours & Co., shows earnings of $21,436,642, which compare with earnings of $19,315,384 in the first six months of 1926. Income from operations was $7,735,888 as against $7,592,520 in the first half of 1926. The company's investment in General Motors Corp. returned $15,969,331, as compared with $11,313,773 in the 1926 first half.

The value of the du Pont company investment in General Motors, equivalent to 1,996,244 shares, was adjusted on the books from $46.88 a share to $60 a share, in March this year. This brings the valuation to $119,774,640 which corresponds closely to the net asset value as shown by the books of General Motors Corp. The adjustment accounts for $26,184,371 of the increase in surplus account.

A letter to stockholders accompanying this report announces that about $14,000,000 of the company's surplus funds have been used to buy 114,000 shares of U. S. Steel Corp. common.

Fishers Buy Baldwin Common

NEW YORK, July 27—The Fisher brothers of Detroit have acquired control of more than 60 per cent of the 200,000 shares of common stock outstanding of Baldwin Locomotive Co., it was reported here today. Whether this includes a control of the company is regarded as problematical, as 200,000 shares of preferred stock have equal voting rights. The preferred is callable at 125. The common stock purchase is reported to have been made on the basis of a confidential report which places Baldwin assets at considerably in excess of the price carried on the books.

Miniger Establishes Profit Sharing Fund

TOLEDO, July 25—A new plan of profit-sharing for the 280 salaried employees of the Electric Auto-Lite Co., has been announced here by C. O. Miniger, president. It is estimated that between $100,000 and $250,000 will be made available for the annual Miniger fund in accordance with the plan.

Mr. Miniger has told the officials of the company that he will split fifty-fifty with them a certain percentage on the volume of business which has been paid to him for several years. By such an arrangement the management was rewarded so that overhead was in ratio with the volume of business and net earnings in the lean years were protected. Five per cent of the Miniger fund will be set aside for special rewards for outstanding accomplishment in the organization. The remainder will be distributed pro-rata with the salaries of those in each of four salary groups. The plan is to be effective as of July 1. First payment will be made about December 16 when half of the fund will become available. On completion of the audit of the books about March 16 the remainder will be paid.

At the same time plans are being made for enabling the 2500 wage earners of the company to increase their earnings. Most of them are on a piece-work basis.

C. I. T. Buys L. F. Weaver

NEW YORK, July 27—Commercial Investment Trust Corp. has purchased the L. F. Weaver Co., San Francisco, one of the older finance companies of the Pacific Coast. The assets acquired exceed $2,000,000. Business of the company will be consolidated with that of the San Francisco subsidiary of Commercial Investment Trust. F. L. and Kent M. Weaver, active heads of the Weaver company, will join the executive staff of the C. I. T. San Francisco office.

A.A.A. and N.A.A. Combine

WASHINGTON, July 27—An affiliation between the American Automobile Association and the National Automobile Association, whereby the 25,000 members of the latter organization will become a part of the A. A. A. has been announced by the Washington office of the American association.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co.*

NEW YORK, July 28—A decline in money rates to the lowest levels reached in several months gave added strength to stock prices last week. Commodity prices, on the other hand, declined sharply. Trade and industry in general remain seasonally quiet, but with signs of impending recovery in some lines, notably iron and steel.

FREIGHT CAR LOADINGS

Holiday observance resulted in an abrupt decrease in railway freight car loadings during the week ended July 9. The total was 839,308 cars, which compares with 1,021,262 cars in the preceding week and 897,556 cars in the corresponding period last year.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended July 20 were about 1 per cent below the total a week earlier but 6.2 per cent above that for the corresponding period last year.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices stood at 137.9 last week, as against 140.5 a week earlier and 139.3 four weeks earlier.

FEDERAL RESERVE REPORT

Bills and securities held by the Federal Reserve banks declined $22,700,000 during the week ended July 20, the principal change being a decrease of $22,900,000 in discounts. Note circulation declined $26,900,000 and deposits $15,000,000, while reserves increased $100,000. The reserve ratio rose from 78 to 78.8 per cent. During the same period, loans of reporting member banks declined $7,198,000, investments $29,093,000, borrowings from the Federal Reserve banks $17,313,000 and net demand deposits $83,228,000. The amount of loans to brokers and dealers, secured by stocks and bonds, made by reporting member banks in New York City was practically unchanged.

All classes of money rates were definitely lower last week. The call loan rate declined to 3½ per cent, the lowest level reached in four months. Rates on time loans at the end of the week were at 4¼ to 4½ per cent, as against 4½ to 4⅝ per cent a week earlier. Commercial paper rates stood at 4 to 4¼ per cent as compared with 4 to 4½ per cent in the preceding week.

Moon Uses Fabric Body

ST. LOUIS, July 27—Moon Motor Car Co. is now using a flexible fabric-panelled body on its Sixty-Six two-door five-passenger coach model which lists at $1,045. The car is finished in a two-color combination of green and gray with a black welt on the molding. Upholstery is Motex.

1½% Car Excise Tax Proposed by Smoot

Says Administration Favors Halving Rather Than Complete Elimination

EXECUTIVE OFFICES, RAPID CITY, S. D., July 25—The Republican administration's attitude towards the abolition of the 3 per cent excise tax on automobiles, was revealed here for the first time this week by an announcement by Senator Reed Smoot of Utah, chairman of the Senate finance committee, visiting the President, that the administration favored cutting in half the present 3 per cent tax, thus leaving a tax of 1½ per cent on passenger cars costing over $1,000.

This would mean a saving to the automobile purchasers of $50,000,000 next year, he said. This sum, Senator Smoot feels, is as much as the administration can afford to turn back to the automotive buying public. Discussing the tax program for the next Congress, Senator Smoot said:

"My purpose in stopping by to see the President is to suggest the need of calling Congress into extraordinary session about Nov. 1. Failure of the deficiency appropriation, totaling $20,000,000 and the Mississippi flood relief and tax revision makes such a move desirable. I think there should be an extra session of Congress starting immediately after Nov. 1.

"As chairman of the finance committee, I favor reducing the present tax on passenger automobiles by half making the sales tax 1½ per cent instead of 3 per cent as at present. That will cut $50,000,000 from our surplus which was $562,000,000 at the end of the last fiscal year.

"Of course the Democrats will urge a tax cut of the entire surplus, including the elimination of all automobile taxes but that's for politics. Such a cut cannot safely be made. We are not going to pass a bill with such drastic cuts as to create a deficit at the end of the next fiscal year. I think the first cut should be made in the corporation tax. It should be reduced from 13½ to 12 per cent, which will lop off $150,000,000 of our surplus. Special taxes such as theatre admission and club dues should be eliminated which will cut off $37,000,000.

"Thus the corporation tax, the automobile reduction and the special tax will cut off $237,000,000, and the remainder should go to the middle man's income tax, i. e., the man earning from $15,000 to $60,000 a year." Senator Smoot said.

President Opposes Session

EXECUTIVE OFFICES, RAPID CITY, S. D., July 25—President Coolidge's attitude toward the calling of an extra session of Congress remains unchanged, it was officially said in his behalf here today. His spokesman said it might be assumed that there is no extra session in sight. The statement was made following a visit by Senator Reed Smoot, of Utah, chairman of the Senate finance committee urging the President to call Congress in extraordinary session the first week in November.

Reo Offers 3 More Speedwagon Models

DETROIT, July 30—The new Reo Speedwagon line will consist of one-ton, two-ton and three-ton models in addition to the 1½-ton and Junior previously announced. Prices of the various chassis are: 1½-ton, $1,345; 143 in. wheelbase, 12-passenger bus chassis, $1,445; 2-ton, $1,645; 3-ton, $2,185; Speedwagon Junior, $895.

All except the Junior model have the former Reo engine but with unit power plant. The 3-ton model has four-speed transmission, others have three-speed. North East electrical system, Brown-Lipe clutch, Schebler carburetor, Reo axles, transmission and steering gear are used. All except the three-ton model have four-wheel brakes. The 3-ton model has double internal brakes on rear wheels. All models are available in stake bodies and the 2-ton in express body. Gear ratios for 2-ton are 6.5, and for 3-ton 6.2 on four speed.

Reduce All-Rail Rate Between Coast Cities

WASHINGTON, July 26—Authority to lower the all-rail rate on automobiles shipped between California and Oregon points was granted this week by the Interstate Commerce Commission on application of the Santa Fe, Southern Pacific and Union Pacific Railways. The rate is lowered in order to compete with the water rate between San Francisco to Tacoma and Seattle. The water rate is $1. The present rail rate is $1.55, and under the new tariff the rate will be $1.27 per cwt.

Application has been made to reduce the rail rate to the equivalent of the water rate but the commission held the opinion that a 27-cent spread between the all-rail and all-water rate was fair to both the railroads and the steamship companies.

F.W.D. Sees Business Good

CLINTONVILLE, WIS., July 23—Branch managers of the Four Wheel Drive Auto Co. gathered at the factory this week. Expressions were unanimous that 1927 will be the most productive of truck sales in the history of the company, barring only war years. Among the managers present were: Charles Cassesse, Boston; Major Thompson Short, Kansas City; E. L. Brown, Washington; R. W. Pachaly, Chicago; H. M. Daniels, New York; M. O. Stockland, San Francisco and A. M. Kerr, Kitchener, Ont.

Tests Air in Cities for Carbon Monoxide

U. S. Health Service to Determine Possible Pollution From Exhaust Gases

WASHINGTON, July 23—How much has the automobile tainted the air of large cities? To what degree does automobile exhaust pollute the air and to what extent does it affect the city dweller's health?

The United Public Health Service is undertaking to answer the questions in 14 of the country's largest cities by measuring the amount of carbon monoxide at various crowded city points. The service announces, in undertaking the survey, that its results may or may not be of practical service to the automobile industry or to the health authorities or traffic officials, but that the question is a moot one and is being undertaken for whatever value can be got by the industry from the results.

Already representatives of the service have visited each city and collected samples of the air in large glass containers, which are now being analyzed at the offices here. The results will not be announced for some months yet, the department says. The cities where the samples were taken include Washington, New Orleans, Los Angeles, San Francisco, St. Louis, Pittsburgh, Baltimore, Philadelphia, New York, Chicago, Detroit, Cleveland, Dallas and Buffalo.

Car Parts Lead Exports

MILWAUKEE, July 25—Official reports covering the shipment of Wisconsin products to foreign countries indicate that automobile frames and other automotive parts are now the most important single item. Value of such exports in the first quarter of 1927 are given as $2,464,000. Next came machinery, not including automotive and agricultural parts, valued at $2,271,000, and tractors and parts were third with a value of $1,736,000. The first three items totaled more than one-third of all first quarter exports with an aggregate value of $18,033,000.

To Make Wire Goods

MERRILL, WIS., July 25—The Merrill Machinery & Supply Co. is installing new equipment in its old foundry building for the manufacture of wire goods of all descriptions. W. A. Talcott, South Bend, Ind., has been named manager.

2000 to Study at Flint

FLINT, July 23—It is expected that the General Motors Institute of Technology, which was formally dedicated by General Motors executives this week, will have an enrollment of approximately 2000 students when the fall term opens.

Lindbergh Flight Spurs Air Travel

Pacific Coast Company Carries 178 Passengers in June, With $4,000 Revenue

SAN FRANCISCO, July 25—Rapid and steady growth of airplane travel on the Pacific Coast is indicated in the report of Pacific Air Transport, Inc., of this city, for June. This corporation is engaged in the transportation by airplane of mail and passengers between Los Angeles, Oakland, Portland and Seattle.

During June the company's receipts for passenger business exceeded $4,000 and were more than double the receipts for the same traffic in May. In June, 178 passengers were carried. Increase in air mail receipts for June over May was $2,100, while the volume of air mail carried between the three coastal cities for June was 729 lb. more than in May. The total for June was more than 6000 lb.

The report interestingly reviews the history of the corporation since its beginning, Sept. 15, 1926. From that date to Jan. 1, 1927, no one applied for passenger transportation. In January, two were carried, with total revenue of $58. In June, as has been shown, 178 passengers traveled, paying more than $4,000 for their transportation. The report says that it was not until after May 21, when Lindbergh crossed the Atlantic, that public interest in air travel began to manifest itself.

The six-passenger Fokker, which the Pacific Air Transport, Inc., operates between Portland and Seattle, carried a capacity list of passengers on 16 of the 25 flying days in June, this year. Flying time between Oakland and Seattle is eight hours. Between Oakland and Los Angeles it is five hours, all daylight flying.

Gets Cuba Air Mail Award

WASHINGTON, July 25—First-class mail destined to Cuba, heretofore handled by steamer, will henceforth be handled by air, the Post Office Department announces. A contract was this week awarded to the Pan-American Airways for the handling of first-class mail, this concern being the successful bidder, offering to carry same for 40½ cents per pound. The Pan-American Airways will use three planes of the three-engine Fokker or Ford type, operating at an average speed of 115 miles per hour.

Take Over Kenosha Truck

KENOSHA, July 25—Purchase of the plant and equipment of the Kenosha Fire Engine & Truck Co. by H. P. Olsen and associates is officially announced. The price is said to be $50,000. The fire engine company was organized by Kenosha capital following the bankruptcy of the Winther Motor Truck Co., and took over the greater part of the plant and machinery. Ralph Mock is president, and J. V. Faith, vice-president. It is the present plan to dissolve, the deal providing amply to meet all claims and leave some residue for stockholders. Whether or not the Olsen interests will continue the production of fire engines and trucks has not been indicated.

Navy Awards Large Airplane Contracts

WASHINGTON, July 23—Contracts for 54 airplanes and 48 Wright aircooled engines, at a total cost of $1,647,478, were awarded this week by the Navy Department. The award is the first made under the appropriation for the fiscal year 1927-28, which began July 1, and is a part of the five-year program which provides for 1000 airplanes of serviceable type capable of war-time duty.

The Curtiss Aeroplane & Motor Co. of Garden City, N. Y., was awarded contracts for 18 planes, equipped with Pratt & Whitney 400 hp. aircooled "Wasp" engines, totalling $513,191. The Chance Vought Corp., Long Island City, N. Y., was awarded a contract for one observation plane at $50,000, and 20 fighting ships for $347,000.

The Consolidated Aircraft Corp. Buffalo, was awarded a contract for 15 training planes for $127,137, all equipped with the "Wasp" engine. The Wright Aeronautical Corp. was awarded a contract for the 48 Wright engines and parts for $610,100. The engines will be of nine cylinders, radial air cooled type and of 500 hp.

Wright Gets Further Order

WASHINGTON, July 27—Contract for the construction of 300 engines of 225 hp. each was placed this week by the Navy Department with the Wright Aeronautic Corp. The motors are known as Whirlwind airplane motors. The contract aggregates $1,500,000. This is the second large contract placed with the same company.

Britain Seeks New Fuel

WASHINGTON, July 23—As an encouragement to the automobile industry in Great Britain to find a substitute for gasoline, the government has announced that it will subsidize a new company just created, known as Fuel Utilization, Ltd., contributing £100,000 toward the study during the next three years. The company will operate works at Richmond, Yorkshire, making a study of synthetic gasoline or gasoline substitutes to combat the high price of motor spirits in Europe.

Opens New York Office

RACINE, WIS., July 23—The Racine Radiator Co. has opened a New York office at 30 Church Street. Ambrose C. Owen, who has been with the organization for a number of years, will be in charge.

Air Express Service Starts September 1

Two-Day Deliveries Between New York and San Francisco Scheduled

SAN FRANCISCO, July 23—Two-day air express service between New York and San Francisco will be started by the American Railway Express Sept. 1, according to announcement by Robert K. Cowle, president of the corporation, who is now on the Pacific coast.

Packages deposited with the express company's offices in New York or San Francisco will arrive in the other terminus on the morning of the second day. Los Angeles and Dallas, Texas, also are to have the two-day air service, Mr. Cowle said, adding: "The express company's contract is with the National Air Transport Company from New York to Chicago and Dallas; with the Boeing Air Transport from Chicago to San Francisco by way of Salt Lake City, and with the Western Air Express from Salt Lake City to Los Angeles on the southern route.

Support by Business Urged

STANFORD UNIVERSITY, CAL., July 26—Cities should make immediate and adequate provision for the handling of commercial aviation traffic, according to Col. A. B. Barber, manager of the transportation and communication department of the United States Chamber of Commerce, who is conducting a course in the seventh annual session of the Western School for Commercial Secretaries, now under way here.

"A widespread network of air mail lines has been placed in operation," Colonel Barber said, "but business men and the public generally have not yet visualized the air mail service clearly enough to avail themselves of its full benefits. Communities located on air routes are finding it necessary to provide up-to-date landing fields, hangars and repair facilities. Other cities should do so to attract commercial air services. Those cities which are best prepared to receive them will be the first to get such service."

Doble Gets New Trial

SAN FRANCISCO, July 23—Abner Doble, former head of the Doble Steam Motors Corp., of this city, has been granted a new trial by the supreme court, after his sentence of one to five years in San Quentin penitentiary had been upheld by the superior court and the appellate court. Doble was convicted, in February, 1926, of violation of the corporate securities act of the state in the sale of securities of the Doble concern beyond the amount allowed by law. All the justices of the supreme court signed the decision, which sets the hearing for San Francisco.

Men of the Industry and What They Are Doing

J. M. Crawford Takes Over New Chevrolet Position

The appointment of J. M. Crawford to the newly created position of assistant chief engineer of the Chevrolet Motor Co. was announced today by O. E. Hunt, vice-president in charge of engineering. Mr. Crawford is assuming his new duties the latter part of July.

Mr. Crawford has been for 21 years an automotive engineer, and for six years previous to taking his new position he was chief engineer of the Auburn Automobile Co. Since his entry into the industry in 1906 Mr. Crawford has served with various automobile companies, chief of which was the old Chalmers Motor Co. He was born and raised in Indianapolis, and, upon his appointment as Mr. Hunt's assistant, moved to Detroit from Auburn. He is making his headquarters with the Chevrolet Motor Co. in the General Motors Building.

C. C. Smith Heads Pusey-Jones

Clement C. Smith, president of the Heil Co., Milwaukee, has been elected to the presidency of Pusey & Jones Co., Wilmington, Del., builders of paper mill machinery and steel ships. Control of this company is held by the Wisconsin Securities Co., of which Mr. Smith is also president.

Lane Joins Cutler

David Lane has been appointed works manager of the Herman Z. Cutler Co., Inc., Bridgeton, N. J., sheet metal manufacturers. For the past three years Mr. Lane had been connected with the Heintz Mfg. Co., Philadelphia, as chief estimator, and previously had served for 11 years with the E. G. Budd Mfg. Co., Philadelphia, in various capacities.

Stevenson Heads Sales

W. S. Stevenson has been appointed manager of sales in the eastern division by Selden Truck Corp., with headquarters in Philadelphia. Mr. Stevenson has had many years' experience in the truck field, having served as general sales manager of the Bethlehem Truck Co., and with the sales departments of Mack and Traylor Truck Co.

Shoemaker Joins Franklin

F. Glenn Shoemaker has been engaged by the Franklin Automobile Co. to supplement its present research engineering staff. For the past seven years Mr. Shoemaker has been employed in research and development work on air-cooled aviation engines at the engineering division of the War Department, McCook Field.

O'Brien on Eastern Trip

Thomas O'Brien, sales manager for Duplex Truck Co., is in the East opening up new territory for his company.

Wales to be President of Transport Congress

The Prince of Wales will preside over the World Motor Transport Congress to be held in London, Nov. 14 to 17, 1927. The congress is the first to be held outside of the United States. It has been organized by the Society of Motor Manufacturers & Traders, Ltd., under the auspices of the Bureau Permanent International des Constructeurs d'Automobiles and with the support of the Imperial Motor Transport Council. Horace Wyatt is organizer of the congress.

Graham Sees Good Fall Sales

Robert C. Graham, vice-president of the Paige-Detroit Motor Car Co., who has just returned to Detroit after a trip across the country in which he called upon Paige dealers en route, is confident that August and September will prove to be very active for automobile sales. He points out that spring and summer sales were a month late in arriving, which should mean that many sales ordinarily made in the earlier part of the season will be registered during August and September.

Knoble Aids Mattimore

Cliff Knoble has been named assistant to W. J. Mattimore, director of advertising of the Chrysler Sales Corp., being promoted to this post from that of director of creative work. Mr. Knoble is well known in the advertising branch of the industry, being formerly advertising manager of the Liberty Motor Car Co., and serving also with other companies in executive capacities.

Duggan Completes Trip

Tom Duggan, merchandising service director of the National Standard Parts Association, is returning to Detroit after a successful trip through the East in which he visited jobbers in a number of cities.

Marmon Promotes Bohannon

J. A Bohannon, purchasing agent of Marmon Motor Car Co., has been promoted to the position of assistant to H. L. Purdy, vice-president in charge of production.

Gates Exports Double

DENVER, July 26—Gates Rubber Co. showed an increase of 115 per cent in export sales in the first six months of 1927, according to F. H. Nassimbene, export manager. Products of the company are now distributed in 52 foreign countries.

Stanton Back From Trip to Europe Trade Centers

Business conditions in Europe are good and prospects for future development are bright, according to D. T. Stanton, manager of export sales for Dodge Brothers, Inc., who has just returned from a two months' trip in which he visited Dodge Brothers dealers in 25 leading cities in Great Britain and the continent.

The northern European countries are in the most satisfactory condition, Mr. Stanton said, with Germany rapidly rising to much of its former strength. American built cars are gaining in popularity every year and Europe seems destined to take a constantly increased proportion of the American production.

Mooney Says Outlook Good

J. D. Mooney, president of General Motors Export Co., sailing for Europe on the Homeric, said the export business of the corporation is running more than 50 per cent better than a year ago. Shipments in the first six months of the year totaled 109,000. The outlook for export business is much better than at any time in General Motors history, Mr. Mooney said.

Hughes Joins Studebaker

James R. Hughes has been appointed chief body engineer of the Studebaker Corp. of America. Previous to joining Studebaker, Mr. Hughes was connected with Ford Motor Co. and its Lincoln division for 14 years.

A.S.M.E. Dates Fuel Meeting

NEW YORK, July 26—A First National Fuels Meeting is scheduled to be held at St. Louis, Oct. 10 to 13, the organizing body being the fuels division of the American Society of Mechanical Engineers. The fuels to be discussed are those burned in industrial powerplants. One of the papers scheduled, "Factors Governing the Purchase of Fuels," is by Morgan B. Smith, engineer of General Motors Corp.

The program has been so arranged that the papers to be presented each day cover a particular branch of the whole subject, except that on the first day papers of a general character will be read. On the second day industrial heating will be the general topic, on the third, powerplants, and on the fourth, smoke abatement.

Buick to Unite Divisions

FLINT, July 25—The Buick Motor Co. has started work on a new $600,000 building which will house the new engineering, experimental and research department. The very latest scientific apparatus will be installed in the structure. Heretofore the various departments have been scattered in the Buick plants.

Prices Are Reduced on 1928 Chandlers

Body Lines Are Improved and Several Custom Built Models Added

CLEVELAND, July 25—The 1928 Chandler line will include a number of custom built bodies all with lower lines. Full crowned fenders, brilliant color combinations and a newly designed radiator incorporating a new Chandler emblem, will be found on all models of the 1928 line. Prices have been reduced on nearly all models, the reductions ranging from $100 to $200.

Several members of the Royal Eight line have been reduced $200 in price and a new model, a five-passenger sedan, listing at $1,795, has been added. All the closed models in the Big Six line have undergone price reductions of $100, while a four-passenger rumble seat roadster listing at $1,695, has been included.

The seven models in the Special Six line remain but little changed with the exception of the general improvements noted. A new model in this line is the Special Six coupe with rumble seat which lists at $1,135, and $1,235 for the de luxe model. A coupe and de luxe model without rumble seat are available in the Special Six line at $1,035 and $1,135 respectively. Another Special Six addition is a five-passenger sportster which lists at $1,145.

Five-Hop Flight Planned Detroit to New Zealand

DETROIT, July 25—Frederick A. Giles, Australian aviator, plans an airplane flight of 11,151 miles which would carry him in five hops from Detroit to Wellington, New Zealand. The flight will be attempted in a Hess Bluebird biplane with Wright Whirlwind engine and the project will be financed by W. H. Rosewarne, a Detroit contractor and Australian by birth.

Giles plans to make the flight in the following stages: Detroit to San Francisco, 2100 miles; to Honolulu, 2230 miles; to Brisbane, Australia, 4709 miles; to Sydney, 550 miles; to Wellington, 1369 miles.

Canada 1926 Output, $133,598,456

WASHINGTON, July 23—The total Canadian automotive output in 1926 was $133,598,456 compared with $110,835,386 in 1925 and $88,480,418 in 1924, according to revised figures furnished the Department of Commerce. Capital employed by 11 companies in Canada producing cars and trucks, amounted to $82,791,968.

Waukesha Opens Office

WAUKESHA, WIS., July 25—Waukesha Motors Co. has opened its new eastern sales office at 8 West Fortieth St., New York.

Nash Shows Comfort in "Come Drive Week"

KENOSHA, July 27—Nash Motors Co. is staging a national "Come Drive Week" from July 27 to Aug. 3, during which its dealers in all cities will invite the public to drive the new Nash models. The week was inaugurated by a Nash radio program broadcast through station WEAF, New York, over its chain of stations. The half-hour musical program was preceded by the announcement of the courtesy drives and an invitation on behalf of Nash dealers was extended by the radio announcer.

The purpose of the week is to give everyone interested in automobiles an opportunity to see how far Nash has gone in developing performance and comfort, said E. H. McCarty, general sales manager. Dealers and salesmen during this period will not talk sales.

British Bus Makers Use Handy-Spicer Equipment

PLAINFIELD, N. J., July 27—Herbert Clark has just returned to the United States after three years in Europe where he has been looking after interests of the Spicer Mfg. Co. and where he supervised the equipping of the Hardy, Spicer & Co., Ltd., factory for the making of Spicer propeller shafts in England for the European market.

Mr. Clark said business conditions in Europe were good and improving all the time. The best results for American manufacturers are obtained by locating a subsidiary factory abroad and thereby taking up some of the unemployment, Mr. Clark said. Hardy-Spicer products are now being used by nearly all commercial vehicle manufacturers in England, he declared.

I.H.C. Ohio Plant Busy

SPRINGFIELD, OHIO, July 25—The International Harvester Co. plant in this city is rushed with business. Orders are being received from foreign countries and from local points for high speed motor trucks and buses. Indications are that trade will keep up right along, it is stated by those in touch with the works. Trucks are being shipped to South America, Chile and Australia.

Tire Makers Cut Prices

NEW YORK, July 27—Goodyear Tire & Rubber Co. has announced a reduction in the price of tires to car manufacturers of about 7½ per cent. Similar action was taken by other leading tire makers.

Studebaker Reduces Prices on 16 Models

Revisions Range From $20 to $260—Will Continue Accessory Equipment

SOUTH BEND, July 27—Price reductions ranging up to $260 were announced today by the Studebaker Corp. of America, on a number of its Big Six and Standard Six models. In connection with the reduction it is stated that there will be no curtailment in the accessories which are standard on these cars and which represent an extra value of $100.

The new and old prices follow:

Big Six 127-in. wheelbase	New	Old
President sedan	$1,985	$2,245
President touring	1,795	1,245
President limousine	2,250	2,495
Big Six 120-in. wheelbase		
4-door sedan	$1,495	$1,585
Sedan regal	1,625	1,710
4-pass. victoria	1,495	1,575
Victoria regal	1,625	1,645
2-pass. coupe	1,495	1,545
Coupe regal	1,625	1.645
4-pass. road.	1,695	1,675
Standard Six		
*4-door sedan	$1,195	$1,245
**4-door sedan	1,295	1,335
4-pass. victoria	1,295	1,325
2-pass. coupe	1,195	1,245
4-pass. coupe	1,295	1,345
4-pass. road.	1,245	1,295

* Plush upholstery.
** Mohair upholstery.

Three Fleetwood Bodies Added to La Salle Line

DETROIT, July 25—Three new custom built bodies originated by Fleetwood have been added to the La Salle line. These include a two-passenger coupe listing at $4,275, a five-passenger sedan at $4,475, and a town cabriolet at $5,000.

Special appointments in the coupe include a one-piece windshield, courtesy lights in the dustshield and a light flooding the package compartment in the rear deck. Special equipment in the sedan includes two foot cushions and a pillow for the rear seat, smoking set with cigar lighter and ash trays, walnut vanity case, clock, mirror, memo pad and two silver perfume bottles, all enclosed in the vanity case. Finish of the chauffeur's compartment in the town cabriolet is in leather, while the rear is in broadcloth. The rear seat is divided by a collapsible arm rest.

Wood Courses Arranged

MADISON, WIS., July 25—Instructional courses of the Forest Products Laboratory have been arranged to make it possible to attend both the gluing course and kiln drying course on one trip to Madison, these being set for Sept. 12 to 30.

Automotive Steels in Greater Demand

Increased Operations in Steel Industry Generally Looked for in August

NEW YORK, July 28—The consensus of opinion in the steel market seems to be that from now on gradual improvement in the demand may be looked for and that, although buying pace in August may continue slow, business in the aggregate will warrant a slightly better rate of operations than that which prevailed this month.

There is an increase in the number of specifications from automotive consumers. Tonnages involved, however, are light and some of the specifications pertain still to commitments carrying old prices, some buyers apparently having been accorded an extension of time in which to specify against old commitments. If any orders for sheets and strip-steel have been placed by the motor car builder who, because of a change in models had been out of the market for a long time, the tonnages placed so far could not have been very impressive.

Some sheet-bars have recently been sent by a motor car builder to a sheet mill, and following conversion into sheets, sent back to the automotive plant. As a general proposition, hand-to-mouth buying continues; in fact some of the smaller automotive consumers are filling immediate wants out of warehouse stocks. Makers of full-finished automobile sheets are adhering strictly to the 4.25 cent quotation, but there have been rumors recently of sales of fender stock at slight concessions.

Recent acquisition by the leadiing independent sheet rolling interest of the pioneer company in the "continuous process" sheetstrip field is looked upon in the market as a stabilizing factor of the greatest importance. Moreover, the consolidation portends intensive work along the line of improving the quality of what are essentially automotive steel products.

Pig Iron—The market for foundry and malleable iron is dull, but steady. The ruling quotation for No. 2 foundry is $18, valley furnace, all offerings at below that price level having passed into the hands of interests that are holding their iron at that figure. Automotive foundries are buying in single carloads.

Aluminum—What appears to be the first water-borne shipment of aluminum from the domestic producer's new reduction plant at Arvida, near Chitoumini, Quebec, arrived at New York last week. It constituted the cargo of the Norwegian S.S. "Tilthorn" which cleared from Alfred Province, Quebec, and consisted of 140,013 packages. Demand for No. 12 Alloy is better than for straight aluminum ingots. Competition among automotive aluminum foundries is keen, and they, in turn, exert much pressure on the market for remelted and secondary metal.

New Paint Adheres to Red Hot Metal

WASHINGTON, July 27—The manufacturer of a new paint product by an English firm is reported to the automotive division of the U. S. Department of Commerce, as being a superior protective coating for iron work, and can be made of practical application to the automotive industry, according to American Trade Commissioner Homer S. Fox at London.

The product is composed of a silicon ester and various pigments, and when applied to iron permits the iron to be heated to redness, then plunged into cold or freezing mixtures, without affecting the adherence of the paint on the iron.

Copper—Following an advance of ½ cent per lb., the market turned rather quiet. Prices for automotive brasses have been advanced proportionate to the rise in the copper market.

Tin—The market is quiet with the undertone steady.

Lead—For the third time in three days the leading interest announced an advance of $2 a ton last Friday. Storage battery makers have covered their July and August requirements.

Zinc—Smelters have curtailed their output and the market rules firm.

Automobile Time Pieces Now Classed as Clocks

WASHINGTON, July 27—A change in the classification of imported time pieces for use in automobiles and the tariff duties thereon, has been announced by the Treasury Department. Five years ago the Department ruled that such imported time pieces for automobiles should be classified as watch movements. The new decision now instructs customs officials that they must henceforth be classified as clocks, the effect of the change being thus to lower the import duty.

The department announces its reversal of its ruling five years ago on the ground that the movements in automobile clocks are usually of the eight-day variety and not of the watch type that have to be wound every day. Henceforth they will be dutiable under paragraph 368 of the tariff act of 1922.

Roller Bearings on Olympian

MILWAUKEE, July 25—The first transcontinental passenger train equipped throughout with roller bearings will go into service between Chicago, Milwaukee and Seattle on Aug. 1, marking another epoch in railroading as advanced by the Chicago, Milwaukee & St. Paul. The new train now going into service replaces the old Olympian, retaining the name.

Hardwood Demand Declines in July

Orders Booked Are From Commercial Field—No Advance Orders Reported

ATLANTA, July 27—Hardwood sales to the automotive industries have been showing a steady decline in volume the past ten days, according to wholesalers and manufacturers in the Atlanta lumber market, and though the gross volume of current business is still well in excess of that of the corresponding period in 1926 and also a little above normal at this time of the season, new bookings are considerably less than they were during May and June. A few orders are being booked by some of the larger manufacturers, mainly in the motor truck and commercial body fields, but all of these orders are comparatively small with prompt shipment wanted, indicating that the only buying being done even by the largest concerns is for current requirements. No orders at all for advance needs are reported by any of the lumber firms in this section in the past two or three weeks.

Thicker dimensions of white ash in the best grade comprise the leading item being taken by the automotive interests, with little business reported in other grades of ash or in maple or elm. Prices remain exceptionally high due to the fact that lumber mills in the lower Mississippi Valley have not as yet been able to resume their production schedules on an active basis, and probably will not be able to do so for some weeks yet.

Olds 1928 Models Show New Lines and Colors

LANSING, July 30—Body changes including rounded on rear quarters, new form-fitting seats and narrower front pillars, are announced by Olds Motor Works on its complete line. Exterior finish is in new and brighter colors with contrasting window reveals on closed models and double belt striping on all models.

Window sills and instrument boards are finished in colors now to harmonize with exterior finish. Inlaid walnut door panels are used on the landau sedan, four-door sedan and sport coupe.

Exterior door panels in bright colors are now part of the finish of the sport roadster and touring cars. Other changes include the adoption of nickeled sunvisor brackets and chromium plated head and cowl lamp rims.

Danish Aviation Exhibition

WASHINGTON, July 23—The Department of Commerce has been advised by the American vice-consul at Copenhagen, E. A. Johnson, that an international aviation exhibition is to be held in Copenhagen, Denmark, from Aug. 20 to Sept. 2.

James Artman Dies After Brief Illness

Former Chilton President Victim of Stroke—Pioneered in Automobile Field

PHILADELPHIA, July 29 — James Artman, founder of *Automobile Trade Journal*, and president of the Chilton Company until December, 1923, died at his summer home in Ocean City, N. J., July 25, following an apoplectic stroke suffered a few days previously. He was born in Philadelphia 62 years ago and had been in active business all his life until his retirement from the presidency of the Chilton company at the time of its merger with Class Journal Co.

Mr. Artman's career as a publisher started in 1894 when he acquired an interest in Cycling, a periodical published in the interest of bicycle riders. In June, 1896, he brought out *Cycle Trade Journal*. Later with popular interest turning to automobiles, the name was changed to *Cycle* and *Automobile Trade Journal* and its editorial activities widened to cover the new field. With the decline of the cycle industry, the publication became the *Automobile Trade Journal*, the first issue under this name appearing in October, 1899.

For the first two years the *Automobile Trade Journal* was published and the business conducted under the name of *Trade Publishing Co.* In 1901, Mr. Artman was joined by George H. Buzby and C. A. Musselman and the company name changed to Trade Advertising & Publishing Company. Mr. Artman became president, Mr. Buzby, vice-president, and Mr. Musselman, treasurer and general manager. The printing was done under contract for several years by the Chilton Printing Co., which was later bought by the three men. In 1910 the name Chilton Company was adopted and the two organizations consolidated.

The first issue of *Chilton Automobile Directory* was published in 1908, after it had appeared for several years as "The Buyers Guide" in *Automobile Trade Journal*. The company's activities were broadened to meet the growing needs of the automotive industry. The first issue of *Commercial Car Journal* appeared in March, 1911, and in July, 1918, the company brought out *Chilton Tractor Journal*. Mr. Artman from the start supervised the editorial activities of the company, remaining as editor-in-chief of all publications until his retirement.

The funeral was held Thursday afternoon.

Rim Production 11,412,974

CLEVELAND, July 26—Rims inspected by the Tire & Rim Association of America, Inc., in the first six months of 1927 totaled 11,412,974. In the full year 1926, 24,199,524 were inspected.

James Artman

Former president of Chilton Co., who died July 25, at his Ocean City home

Louisville Dealers Find Windsor Plan Beneficial

LOUISVILLE, July 25—The Windsor Plan of used car valuation has proved valuable to members of the Louisville Automobile Dealers Association, a survey just completed by that organization indicates. The plan was adopted by Louisville dealers in April. "When our association adopted the Windsor Plan we did not expect instant results and planned to give it a thorough trial," says Garland Lea, secretary-treasurer. "Now after three months our dealers are practically unanimous in their approval. During the survey dealers cited many instances where the plan had enabled them to buy used cars at lower prices and to close deals with less haggling than in the past. The plan has placed the automobile business here on a higher plane and has created public good will to no small extent. We are well pleased and expect to continue with the plan indefinitely."

Auburn Exports Gain 117%

AUBURN, IND., July 23—Export sales of Auburn Automobile Co. in the first half of the year were 1160 cars, exceeding the entire 1926 export total by 71, and an increase of 117 per cent over exports in the first six months of 1926, according to E. L. Cord, president. A total export of 2400 cars is expected by the end of the year.

Otto Kahlenberg

MILWAUKEE, July 25 — Otto Kahlenberg, one of the founders and principal owners of the Kahlenberg Engine Co., Two Rivers, Wis., a pioneer in the marine engine industry, died July 16 following a heart attack. He was 54 years of age and noted as a designer of heavy duty internal combustion engines.

Hudson Adds Models on 118 in. Wheelbase

Coach at $1,175 and Sedan at $1,285 First of New Intermediate Line

DETROIT, July 30—Two new models on an 118 in. wheelbase have been added to the Hudson line, according to an announcement by the Hudson Motor Car Co. The two models, a coach, listing at $1,175 and a four-door sedan listing at $1,285, are intended to fill the price gap between the Hudson and Essex lines.

Mechanically the new models are identical with the 126 in. models, with the exception of such changes in the frame, bodies, etc., as was necessitated by the shorter wheelbase. Equipment and finish is the same as on the standard line Hudson models. Gear ratio is a little faster, being 4 1/12 to one.

High Compression Heads Offered on La Salle

DETROIT, July 25—Following a large number of inquiries for La Salle roadsters and phaetons equipped with high compression heads and high gear ratio, as a result of the recent test at the General Motors Proving Grounds in which a similarly equipped roadster averaged 95.2 miles per hour, Cadillac Motor Car Co. is announcing that it is offering similar equipment for La Salle roadsters and phaetons. The new high compression heads have a compression ratio of 5.1 to with a compression pressure of 100 lb. Ethyl gasoline or other anti-knock fuels are to be used with these heads. The new gear ratios are four to one.

Extra cost for this equipment is $125. When such equipment is used, the factory recommends the purchase of wire wheels, due to the higher speeds and increased acceleration. These wheels are offered at $95 additional, bringing the total cost to $220.

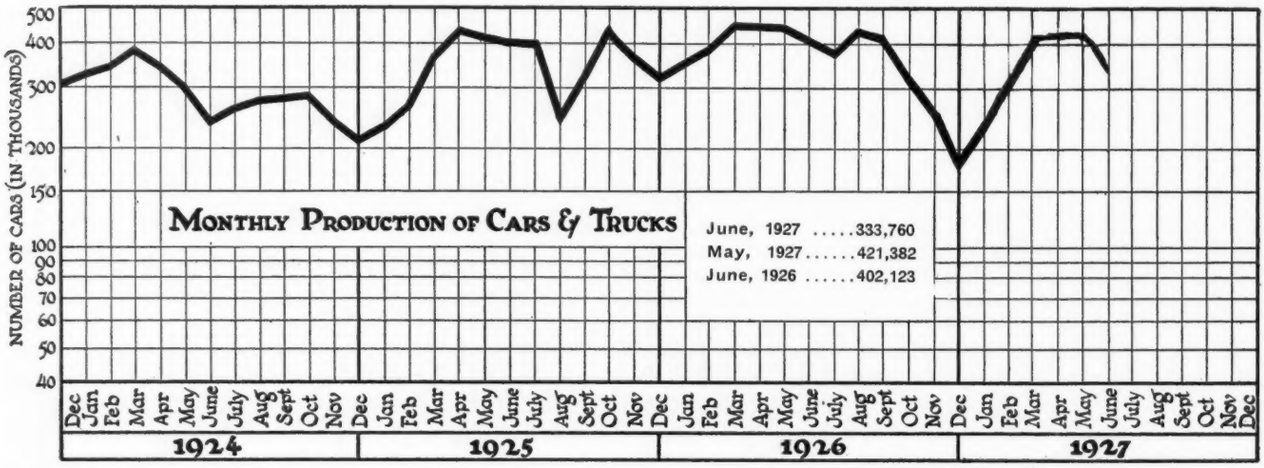
Fageol Sales Increase

OAKLAND, CAL., July 25—Truck construction by Fageol Motors Co. has increased to 313 vehicles made and sold in the first six months of 1927, as compared with 320 made and sold in all of 1926, according to a statement to stockholders just issued by L. H. Bill, president of the corporation. "This increase is largely due to the establishment of our own branch sales offices in Los Angeles, Oakland, San Francisco, Portland and Seattle," said Mr. Bill.

Reo Branch Managers Meet

LANSING, July 23—The 30 factory branch managers of Reo Motor Car Co. have concluded their semi-annual meeting at the factory. The managers, who came from all parts of the country, report the heaviest business in the history of the company.

June Production Declines 21 Per Cent



Half Opens Strong, Reports M. & A.M.A.

NEW YORK, Jan. 25—The automotive parts and accessory business has entered the second half of 1927 in strong position, according to the Motor & Accessory Manufacturers Association. June output was slightly below the high May level and July is expected to show results approximately as good as the previous month.

The June index figure was shown as 167, comparing with 172 in May. Original equipment sales showed a June index of 176 as against 184 in May, and 140 in June, 1926. The replacement parts sales index was 130 as against 123 in May and 135 in June last year. The accessory index was 132 as against 131 in May and 140 in June, 1926. The garage equipment index was 171 as against 192 in May and 184 in June last year.

I.H.C. Expands at Moline

MOLINE, July 23—International Harvester Co., which has begun construction of the first unit of a $5,000,000 plant in East Moline, this week doubled the size of the warehouse which will begin its plant here, providing for 450,000 sq. ft. of floor space. Industrial circle rumors that negotiations are under way between International and Yellow Sleeve Engine Works or the E. H. Wilson Body Corp. for purchase of their plants in this community, have not been confirmed or commented upon by interests closely affiliated with the two companies.

Olds Schedules 325 Daily

LANSING, July 22—With a schedule of 7000 units for domestic sale and 750 for export, Olds Motor Works are planning a daily production schedule of 325 cars for August. Due to a body shortage the plant has been able to operate only on a five-day schedule recently. Bodies are now coming through, however, which will allow the company to go ahead with its proposed schedules.

It is reported that stocks of cars in the hands of dealers are at the lowest point in months. This condition is largely attributed to the Oldsmobile price cut on May 31.

Demand for cars for export is particularly gratifying to executives of the company who state that the schedule of 750 for August is nearly 300 greater than the June allotment.

The number of employees in the Olds and Fisher plants here is at the highest point for the past 12 months.

Chevrolet July Output Brings Total to 697,318

DETROIT, July 30—July production figures for Chevrolet Motor Co. indicate that Chevrolet's production for the first seven months of 1927 is nearly equal the entire year's output for 1926, when Chevrolet set an all-time production record for the manufacture of gearshift cars.

The July production totaled 89,569 units compared with 50,993 cars in July, 1926, a gain of 75 per cent. The percentage of gain was the largest registered in any month this year, the best previous gain being in February.

Output for July brings production for the first seven months to 697,318 cars compared with 728,697 for the entire year of 1926. Indications now are that last year's figure will be exceeded by Chevrolet before August gets fairly under way. Chevrolet executives are also confident that the goal of a million cars which was set by the company early in the year will be reached.

Chrysler Wins Hill Climb

DETROIT, July 25—Word has been received by the Chrysler Corp. of the winning of five first places by Chrysler cars in the 1927 Mulder's Drift hill climb of the Transvaal Automobile Club in South Africa. Chrysler cars also won three seconds, two thirds, two fourths, one fifth and one sixth.

Marmon Sales Show Increase to 10,366

INDIANAPOLIS, July 25—Marmon Motor Car Co. reports a gain of 51 per cent in sales in the fiscal year ended June 30, 1927, the total being 10,366 as against 5701 in the 1926 fiscal year. Successful introduction of the Marmon Eight is credited with establishing most of this increase. Despite the expense of developing the eight, the profits for the year will approximate those of the 1926 period.

The company is proceeding with its plan to expand its production facilities by transforming the former flour mill machinery plant into a car producing unit. Under the plan, this plant will build the Marmon 75, releasing plant No. 2 for increased production of the eight, which until now has been built only in the newest unit known as plant No. 3.

Retail sales of Marmon in July are holding the same level as during spring months and the company reports unfilled orders totaling several million dollars in value. June sales of the eight showed a 27 per cent increase over May. About 10 per cent of the production is going to export markets. The domestic distributor organization shows steady increase since the introduction of the eight.

Federal Truck Launches Wider Sales Campaign

DETROIT, July 26—Federal Motor Truck Co. will increase its advertising campaign in conjunction with its new line of trucks which gives the company a much wider sales opportunity than formerly. The line, including fours and sixes, is the most extensive Federal has ever offered.

In connection with its advertising campaign, the company is promoting sales educational work among its dealers and their salesmen through sales manuals and factory courses in truck selling.

6 Paint Companies Combine Interests

Form New Arco Company With S. D. Wise as Head —Capital $2,500,000

CLEVELAND, July 26—Six of Cleveland's oldest and best known manufacturers of paint, varnish and lacquers have consolidated their entire holdings and interests, according to announcement made by S. D. Wise, formerly president of the Arco Co. and now head of the new organization. The merger is made to effect marketing economies.

In the consolidation are the Arco Co., Argus Mfg. Co., Crescent Paint & Mfg. Co., Eclipse Paint & Mfg. Co., Iroquois Mfg. Co., and Sterling Products Co., all of Cleveland. These, with Arco Co., Ltd., Toronto, and Sterling Service Co., Pittsburgh, complete the merger. The new company, which will be known as the Arco Co., is chartered under the laws of Ohio, and has issued 100,000 shares of no par value stock. A capital investment of about $2,500,000 is said to be represented.

Far East Market Active Star Distributor Says

OAKLAND, CAL., July 25—H. Schoenherr, general manager of the Behn-Meyer China Co., Ltd., distributor of Star cars throughout the Far East, was a visitor at the Pacific Coast Star plant here, where he spent two days studying distribution and sales methods, as well as the local Star retail store operated by Walter C. Sword. Mr. Schoenherr placed an order for nearly 200 Stars, largely convertible cabriolets, which he says are the most popular type in the Far East. This order follows one of 35 cars for Japan and another of 45 for Manila.

"We have sold 152 Stars in China since May 1," said Mr. Schoenherr. "We could have sold as many more except for the unsettled conditions of the internal war going on there. There are 179 makes of automobiles represented in the Shanghai district, with 3748 privately owned cars and 308 publicly owned in operation there. Automobiles are being used in regular freight service between Tientsin and Urga, capital of Mongolia, a distance of 680 miles, with roads that are all but impassable. Every trip both ways finds more freight offered than can be carried, with the result that the cars are loaded with crates and bags, as well as passengers. Rates are so high that a Mongolian freighter can pay for his car in two trips."

Joins Testing Material Congress

NEW YORK, July 25—An international congress for testing materials will be held at Amsterdam, Holland, Sept. 12 to 17, 1927. The American Society for Testing Materials is participating in this congress and has appointed a special committee consisting of T. D. Lynch, chairman; P. H. Bates, T. G. Delbridge, Zay Jeffries and G. W. Thompson. The committee has secured a number of offers of papers to be presented at the Congress.

Studebaker Profit $8,472,383 in Half

SOUTH BEND, July 26—Net profit of Studebaker Corp. of America for the first six months was $8,472,383, comparing with $8,735,861 in the first six months of 1926. Cars sold in the first six months of 1927 totaled 61,820 as against 59,400 in the same period last year. Net sales in the 1927 period totaled $73,151,679 as against $75,840,607 in the 1926 period.

Current assets as of June 30 totaled $49,912,180 as against $47,548,293 on Dec. 31. Current liabilities decreased from $10,285,854 to $9,547,619. Cash decreased from $14,649,465 to $10,334,131, receivables decreased from $5,762,024 to $3,857,746, and inventories increased from $21,581,408 to $31,351,691. Surplus as of June 30 stood at $40,056,215 as against $36,553,832 on Jan. 1.

Bantam to Move Plant

HARTFORD, CONN., July 30—Winfield Scott Rogers, president of the Bantam Ball Bearing Co., was in Troy, N. Y., this week conferring with the industrial commission of that city in regard to a possible removal of the ball bearing plant to Troy. Invitations have been received by the company, President Rogers says, to visit Detroit and Toledo with a view to moving the plant to the Middle West.

Bendix Appoints Stations

CHICAGO, July 26—Wheels, Inc., New York City, has been appointed service representatives and parts distributors for Bendix brakes in the New York territory as the first of a nation-wide series of service stations.

Lloyd's Cover Stutz at Lowered Rates

INDIANAPOLIS, July 26—Stutz Motor Car Co. of America, Inc., has announced that Lloyd's has offered to insure Stutz cars at rates from 20 to 50 per cent under the accepted manual rates for practically all types of coverage. The coverage applies only on cars that are owned outright and is based upon the safety features built into the car such as the Fedco system of theft protection, low center of gravity, safety glass and hydrostatic four-wheel brakes.

Financial Notes

Motor Wheel Corp. and subsidiaries report for June 30, 1927, quarterly net profit of $531,544 after Federal taxes, interest, etc., equivalent after dividend requirements on 8 per cent preferred stock to 93 cents a share earned on 550,000 no par shares of common stock. This compares with 505,403 or 88 cents a share in preceding quarter and $417,890 or 72 cents a share in second quarter of 1926. Net profit for the first half of 1927 totaled $1,036,958 after above charges, equal to $1.81 a share on common, against $996,027 or $1.74 a share in first half of 1926.

Stewart-Warner Speedometer Corp. reports for quarter ended June 30, 1927, net profit of $1,508,878 after depreciation, Federal taxes, etc., equivalent to $2.51 a share earned on 599,990 shares of no par stock. This compares with $1,062,048 or $1.77 a share in preceding quarter and $1,768,713 or $2.94 a share in second quarter of 1926. Net profit for first half of 1927 amounted to $2,570,926 after above charges, equal to $4.28 a share against $3,121,815 or $5.20 a share in the first half of 1926.

Willys-Overland, Inc., as of June 30, showed more than $15,000,000 in cash. The company will retire $1,000,000 in outstanding bonds on Sept. 1, and provision has been made for the retirement of $745,512 of preferred stock at the end of July. The company will have a minimum of engineering expense this year, John N. Willys, president, said, owing to its developments in the light car field a year ago.

Eaton Axle & Spring Co. reports for quarter ended June 30, 1927, profit of $304,492 after all charges but before Federal taxes, comparing with $274,853 in preceding quarter and profit of $465,595 in June quarter of 1926. Profit for first half of 1927 totaled $579,545 before Federal taxes, against $669,231 in first six months of previous year. Stock outstanding consists of 250,000 no par shares.

Kelly-Springfield Tire Co. for six months ended June 30, 1927, reports net profit of $945,348 after interest, depreciation, Federal taxes, etc., equivalent after allowing for dividend requirements on 6 per cent and 8 per cent preferred stocks to $1.78 a share (par $25) earned on 363,840 shares of common stock.

Pierce-Arrow Motor Car Co. shows income for the first half of 1927 as $115,383, equal to $1.15 a share on the preferred, against $803,843 in the first half of 1926, or $1.22 on the common stock after preferred dividends.

Willys-Overland Reports 124,301 Sales in 1st Half

NEW YORK, July 26—Willys-Overland sales for six months are within 55,000 units of the total sales for 1926. Including Canadian and export business, sales amounted to 124,301 cars, an increase of 30 per cent over first half of last year. Stock in dealers' hands recently were 13.5 per cent less than at end of May.

Government Sells 102,929 Surplus Cars

WASHINGTON, July 23—A total of 102,929 passenger cars and trucks have been declared surplus by the War Department following the war up to the present date and have been allocated, the department announced here this week.

Largely through the intervention of the National Automobile Chamber of Commerce, the government was prevailed on not to sell the bulk of this automotive surplus stock back into the marts of trade, on representation that the government would not only sustain a large financial loss but that it would also have a tendency to disrupt the automobile and especially the truck market, if dumped all at once.

The department announces that the disposition was as follows: 52 per cent was allocated to other government departments of the Federal Government; 40.3 per cent was sold to State, municipal county and some outside private parties, while 7.7 per cent was salvaged.

Britain Clears Stocks

WASHINGTON, July 23—The last of Great Britain's surplus war supplies, valued at $3,500,000,000, have been sold, the Department of Commerce is advised by the American commercial attache at London. The amount realized is not given, but it was estimated that approximately 100,000 motor cars and trucks were sold, one of the largest items being a motor truck plant which cost the government $35,000,000 to build during the war. Sales of airplane surplusages were the slowest, it was stated.

Sells German Bearings

NEW YORK, July 23—Sachs Bearings, Inc., have opened an office at 114 Liberty St., as United States and Canadian representative of Fichtel & Sachs, A. G. German manufacturers of ball and roller bearings, steel balls, etc. Stocks will be carried in New York, Cleveland and Chicago.

Leviathan to Shoot Planes from Catapult

NEW YORK, July 23—An experiment in the catapulting of airplanes from the deck of the Leviathan, carrying mail and passengers, soon will be made according to Captain Herbert Hartley, following the trip of the liner to this country on which it carried Commander Byrd, Clarence Chamberlin, and members of the Byrd flight to Europe.

Trade Press Advertising Aids Atlanta Promotion

ATLANTA, July 27—The value of the industrial trade press as an advertising medium is adequately evidenced in a report by the Industrial Bureau of the Atlanta Chamber of Commerce concerning results obtained in the national advertising campaign to attract new industries. The report of the bureau shows that during the first half of 1927 there were 73 new companies located in Atlanta, while the number of inquiries on hand from other concerns indicates a better record in the last half.

In 1926 a similar campaign was conducted on a much smaller scale, 148 new companies locating in Atlanta during that year. This resulted in the subscribing of a fund of $1,000,000 by leading Atlanta business houses for a larger campaign to run during 1927, 1928 and 1929, in which trade papers are the principal medium being used.

Heavy Reo Truck Schedule

LANSING, July 23—The commercial vehicle plant of the Reo Motor Car Co. went on a production schedule of 100 units daily, this week, and indications are that overtime will be the rule for this division of the Reo company for several months to come.

Banks Represented on Citroen Board

PARIS, July 12 (*by mail*) Up to the time when the capital stock of the Citroen company was increased from 100,000,000 to 300,000,000 francs, the company had only a single administrator or director, M. Andre Citroen. When the new capital was furnished through the banking firm of Lazard Freres, one of the terms of the agreement was that the number of directors should be increased, so as to give a substantial and harmonious structure to the administrative and financial organization. The following directors have now been nominated:

Andre Citroen, Manufacturer; G. M. Haardt, works manager of Citroen; Inspector-General Mauclere, director of the P-L-M Railroad; M. Aubrun, director of Schneider & Cie.; M. Taffanel, general manager of the Chatillon Steel Works; M. R. Phillippe, member of Lazard Freres; M. P. Frantzen, consulting engineer to Lazard Freres; M. A. Meyer, member of Lazard Freres.

The Citroen works are said to be still well employed. It is understood that the tooling up for the new six-cylinder model is well advanced. The price of the sedan model is expected to be only 2,500 francs more than that of the corresponding four cylinder Model B-14 (24,000 francs or $940).

Canada Tire Exports Rise

WASHINGTON, July 23—Exports of automobile casings from Canada during May total 132,710, compared with April exports of 117,648. Exports for the first five months of this year were 756,000 compared with 440,000 exported in the same period last year, according to figures furnished the automotive division, U. S. Department of Commerce.

The May average export price for casings was $9.97, while the inner tube unit value was $1.88 per tube. Exports of inner tubes totaled 131,759, compared with 145,825 tubes in April.

Calendar of Coming Events

SHOWS

Chicago .....Nov. 7-12
Exposition, Coliseum, Automotive Equipment Association.

Chicago .....Jan. 28-Feb. 4
National, Coliseum, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.

Chicago .....Jan. 28-Feb. 4
Automobile Salon, Hotel Drake.

Cleveland .....Sept. 19-23
Exposition, Public Auditorium, National Machine Tool Builders' Ass'n.

Cleveland .....Oct. 3-7
Exhibition, Public Auditorium, American Electric Railway Ass'n.

Cleveland .....Nov. 14-19
Convention Hall, National Standard Parts Association.

Cleveland .....Jan. 9-13
Public Auditorium, American Road Builders Association.

London .....Oct. 14-22
Olympia Passenger Car Show.

London .....Nov. 17-26
Olympia Truck Show.

Los Angeles .....Feb. 11-18
Automobile Salon, Hotel Biltmore.

New Haven, Conn. .....Sept. 6-9
Machine Tool Exhibition.

New York .....Nov. 27-Dec. 3
Automobile Salon, Hotel Commodore.

New York .....Jan. 7-14
National, Grand Central Palace, National Automobile Chamber of Commerce, including special Shop Equipment Exhibit.

Paris .....Oct. 6-16
Grand Palais.

San Francisco .....Feb. 25-March 3
Automobile Salon, Hotel St. Francis.

CONVENTIONS

American Chemical Society, Detroit, Sept. 6-8

American Electric Railway Association, Public Auditorium, Cleveland..Oct. 3-7

American Road Builders' Ass'n., Hotel Hollenden, Cleveland .....Jan. 9-13

American Society of Mechanical Engineers, First National Fuels Meeting, St. Louis.....Oct. 10-13

American Society for Steel Treating, Convention Hall, Detroit....Sept. 19-24

Automotive Equipment Association, Coliseum, Chicago .....Nov. 7-12

National Safety Council, Stevens Hotel, Chicago .....Sept. 26-30

National Standard Parts Association, Hotel Hollenden, Cleveland..Nov. 14-19

S. A. E.
National

Chicago, November—National Transportation and Service Meeting.

Chicago, Dec. 1—Tractor Meeting.

Cleveland and Detroit, Sept. 19-22—Production Meeting.

Detroit, Jan. 24-27—Annual Meeting.

New York, Jan. 12—Annual Dinner.

RACES

Altoona, Pa. .....Sept. 5
Atlantic City .....Sept. 5
British Grand Prix, Brooklands.....Oct. 1
Charlotte, N. C. .....Sept. 19
Detroit .....Sept. 10
Los Angeles .....Nov. 24
Salem, N. H. .....Oct. 12
Syracuse, N. Y. .....Sept. 3